1. Preface
2. Welcome to Economics!
    1. Introduction
    2. What Is Economics, and Why Is It Important?
    3. Microeconomics and Macroeconomics
    4. How Economists Use Theories and Models to Understand Economic Issues
3. Demand and Supply
    1. Introduction to Demand and Supply
    2. Demand, Supply, and Equilibrium in Markets for Goods and Services
    3. Shifts in Demand and Supply for Goods and Services
    4. Changes in Equilibrium Price and Quantity: The Four-Step Process
    5. Price Ceilings and Price Floors
    6. Demand, Supply, and Efficiency
    7. Introduction to Labor and Financial Markets
    8. Demand and Supply at Work in Labor Markets
4. Elasticity
    1. Introduction to Elasticity
    2. Price Elasticity of Demand and Price Elasticity of Supply
    3. Polar Cases of Elasticity and Constant Elasticity
5. The Macroeconomic Perspective
    1. Introduction to the Macroeconomic Perspective
    2. Measuring the Size of the Economy: Gross Domestic Product
    3. Adjusting Nominal Values to Real Values
    4. Introduction to Unemployment
    5. How the Unemployment Rate is Defined and Computed
6. Inflation
    1. Introduction to Inflation

    2. Tracking Inflation
    3. How Changes in the Cost of Living are Measured
7. Money
    1. Introduction to Money and Banking
    2. Defining Money by Its Functions
    3. Measuring Money: Currency, M1, and M2
    4. The Role of Banks
    5. How Banks Create Money
8. The Aggregate Demand/Aggregate Supply Model
    1. Introduction to the Aggregate Demand/Aggregate Supply Model
    2. Macroeconomic Perspectives on Demand and Supply
    3. Building a Model of Aggregate Demand and Aggregate Supply
    4. Shifts in Aggregate Supply
    5. Shifts in Aggregate Demand
    6. How the AD/AS Model Incorporates Growth, Unemployment, and Inflation
    7. Introduction to the Neoclassical Perspective
    8. The Building Blocks of Neoclassical Analysis
    9. The Policy Implications of the Neoclassical Perspective
9. Monetary Policy and Fiscal Policy
    1. Introduction to Monetary Policy and Bank Regulation
    2. The Federal Reserve Banking System and Central Banks
    3. Bank Regulation
10. Introduction to Government Budgets and Fiscal Policy
11. Government Spending
12. Taxation
13. Federal Deficits and the National Debt

Preface

Principles of Economics is designed for a two-semester principles of economics sequence. It is traditional in coverage, including introductory economics content, microeconomics, macroeconomics and international economics. At the same time, the book includes a number of innovative and interactive features designed to enhance student learning. Instructors can also customize the book, adapting it to the approach that works best in their classroom.

Welcome to *Principles of Economics*, an OpenStax resource. This textbook has been created with several goals in mind: accessibility, customization, and student engagement—all while encouraging students toward high levels of academic scholarship. Instructors and students alike will find that this textbook offers a strong foundation in economics in an accessible format.

About OpenStax

OpenStax is a non-profit organization committed to improving student access to quality learning materials. Our free textbooks go through a rigorous editorial publishing process. Our texts are developed and peer-reviewed by educators to ensure they are readable, accurate, and meet the scope and sequence requirements of today's college courses. Unlike traditional textbooks, OpenStax resources live online and are owned by the community of educators using them. Through our partnerships with companies and foundations committed to reducing costs for students, OpenStax is working to improve access to higher education for all. OpenStax is an initiative of Rice University and is made possible through the generous support of several philanthropic foundations.

About OpenStax's Resources

OpenStax resources provide quality academic instruction. Three key features set our materials apart from others: they can be customized by instructors for each class, they are a "living" resource that grows online through contributions from science educators, and they are available free or for minimal cost.

Customization

OpenStax learning resources are designed to be customized for each course. Our textbooks provide a solid foundation on which instructors can build, and our resources are conceived and written with flexibility in mind. Instructors can select the sections most relevant to their curricula and create a textbook that speaks directly to the needs of their classes and student body. Teachers are encouraged to expand on existing examples by adding unique context via geographically localized applications and topical connections.

Principles of Economics can be easily customized using our online platform (http://cnx.org/content/col11613/). Simply select the content most relevant to your current semester and create a textbook that speaks directly to the needs of your class. *Principles of Economics* is organized as a collection of sections that can be rearranged, modified, and enhanced through localized examples or to incorporate a specific theme of your course. This customization feature will ensure that your textbook truly reflects the goals of your course. *Principles of Economics* is also available in two volumes, one covering microeconomics and one covering macroeconomics principles.

Curation

To broaden access and encourage community curation, *Principles of Economics* is “open source” licensed under a Creative Commons Attribution (CC-BY) license. The economics community is invited to submit examples, emerging research, and other feedback to enhance and strengthen the material and keep it current and relevant for today’s students. You can submit your suggestions to info@openstaxcollege.org.

Cost

Our textbooks are available for free online, and in low-cost print and e-book editions.

About *Principles of Economics*

Principles of Economics is designed for a two-semester principles of economics sequence. The text has been developed to meet the scope and sequence of most introductory courses. At the same time, the book includes a number of innovative features designed to enhance student learning. Instructors can also customize the book, adapting it to the approach that works best in their classroom.

Coverage and Scope

To develop *Principles of Economics*, we acquired the rights to Timothy Taylor's second edition of Principles of Economics and solicited ideas from economics instructors at all levels of higher education, from community colleges to Ph.D.-granting universities. They told us about their courses, students, challenges, resources, and how a textbook can best meet the needs of both instructors and students.

The result is a book that covers the breadth of economics topics and also provides the necessary depth to ensure the course is manageable for instructors and students alike. And to make it more applied, we have incorporated many current topics. We hope students will be interested to know just how far-reaching the recent recession was (and still is), for example, and why there is so much controversy even among economists over the Affordable Care Act (Obamacare). The Keystone Pipeline, Occupy Wall Street, minimum wage debates, and the appointment of the United States' first female Federal Reserve chair, Janet Yellen, are just a few of the other important topics covered.

The pedagogical choices, chapter arrangements, and learning objective fulfillment were developed and vetted with feedback from educators dedicated to the project. They thoroughly read the material and offered critical and detailed commentary. The outcome is a balanced approach to

micro and macro economics, to both Keynesian and classical views, and to the theory and application of economics concepts. New 2015 data are incorporated for topics that range from average U.S. household consumption in Chapter 2 to the total value of all home equity in Chapter 17. Current events are treated in a politically-balanced way as well.

The book is organized into eight main parts:

What is Economics? The first two chapters introduce students to the study of economics with a focus on making choices in a world of scarce resources.
Supply and Demand, Chapters 3 and 4, introduces and explains the first analytical model in economics: supply, demand, and equilibrium, before showing applications in the markets for labor and finance.
The Fundamentals of Microeconomic Theory, Chapters 5 through 10, begins the microeconomics portion of the text, presenting the theories of consumer behavior, production and costs, and the different models of market structure, including some simple game theory.
Microeconomic Policy Issues, Chapters 11 through 18, cover the range of topics in applied micro, framed around the concepts of public goods and positive and negative externalities. Students explore competition and antitrust policies, environmental problems, poverty, income inequality, and other labor market issues. The text also covers information, risk and financial markets, as well as public economy.
The Macroeconomic Perspective and Goals, Chapters 19 through 23, introduces a number of key concepts in macro: economic growth, unemployment and inflation, and international trade and capital flows.
A Framework for Macroeconomic Analysis, Chapters 24 through 26, introduces the principal analytic model in macro, namely the Aggregate Demand/Aggregate Supply Model. The model is then applied to the Keynesian and Neoclassical perspectives. The Expenditure-Output model is fully explained in a stand-alone appendix.
Monetary and Fiscal Policy, Chapters 27 through 31, explains the role of money and the banking system, as well as monetary policy and financial regulation. Then the discussion switches to government deficits and fiscal policy.

International Economics, Chapters 32 through 34, the final part of the text, introduces the international dimensions of economics, including international trade and protectionism.

Chapter 1 Welcome to Economics!
Chapter 2 Choice in a World of Scarcity
Chapter 3 Demand and Supply
Chapter 4 Labor and Financial Markets
Chapter 5 Elasticity
Chapter 6 Consumer Choices
Chapter 7 Cost and Industry Structure
Chapter 8 Perfect Competition
Chapter 9 Monopoly
Chapter 10 Monopolistic Competition and Oligopoly
Chapter 11 Monopoly and Antitrust Policy
Chapter 12 Environmental Protection and Negative Externalities
Chapter 13 Positive Externalities and Public Goods
Chapter 14 Poverty and Economic Inequality
Chapter 15 Issues in Labor Markets: Unions, Discrimination, Immigration
Chapter 16 Information, Risk, and Insurance
Chapter 17 Financial Markets
Chapter 18 Public Economy
Chapter 19 The Macroeconomic Perspective
Chapter 20 Economic Growth
Chapter 21 Unemployment
Chapter 22 Inflation
Chapter 23 The International Trade and Capital Flows
Chapter 24 The Aggregate Demand/Aggregate Supply Model
Chapter 25 The Keynesian Perspective
Chapter 26 The Neoclassical Perspective
Chapter 27 Money and Banking
Chapter 28 Monetary Policy and Bank Regulation
Chapter 29 Exchange Rates and International Capital Flows
Chapter 30 Government Budgets and Fiscal Policy
Chapter 31 The Impacts of Government Borrowing
Chapter 32 Macroeconomic Policy Around the World
Chapter 33 International Trade

Chapter 34 Globalization and Protectionism

Appendix A The Use of Mathematics in Principles of Economics
Appendix B Indifference Curves
Appendix C Present Discounted Value
Appendix D The Expenditure-Output Model

Alternate Sequencing
Principles of Economics was conceived and written to fit a particular topical sequence, but it can be used flexibly to accommodate other course structures. One such potential structure, which will fit reasonably well with the textbook content, is provided. Please consider, however, that the chapters were not written to be completely independent, and that the proposed alternate sequence should be carefully considered for student preparation and textual consistency.

Chapter 1 Welcome to Economics!
Chapter 2 Choice in a World of Scarcity
Chapter 3 Demand and Supply
Chapter 4 Labor and Financial Markets
Chapter 5 Elasticity
Chapter 6 Consumer Choices
Chapter 33 International Trade
Chapter 7 Cost and Industry Structure
Chapter 12 Environmental Protection and Negative Externalities
Chapter 13 Positive Externalities and Public Goods
Chapter 8 Perfect Competition
Chapter 9 Monopoly
Chapter 10 Monopolistic Competition and Oligopoly
Chapter 11 Monopoly and Antitrust Policy
Chapter 14 Poverty and Economic Inequality
Chapter 15 Issues in Labor Markets: Unions, Discrimination, Immigration
Chapter 16 Information, Risk, and Insurance
Chapter 17 Financial Markets
Chapter 18 Public Economy
Chapter 19 The Macroeconomic Perspective
Chapter 20 Economic Growth

Chapter 21 Unemployment
Chapter 22 Inflation
Chapter 23 The International Trade and Capital Flows
Chapter 24 The Aggregate Demand/Aggregate Supply Model
Chapter 25 The Keynesian Perspective
Chapter 26 The Neoclassical Perspective
Chapter 27 Money and Banking
Chapter 28 Monetary Policy and Bank Regulation
Chapter 29 Exchange Rates and International Capital Flows
Chapter 30 Government Budgets and Fiscal Policy
Chapter 31 The Impacts of Government Borrowing
Chapter 32 Macroeconomic Policy Around the World
Chapter 34 Globalization and Protectionism

Appendix A The Use of Mathematics in Principles of Economics
Appendix B Indifference Curves
Appendix C Present Discounted Value
Appendix D The Expenditure-Output Model

Pedagogical Foundation

Throughout the OpenStax version of *Principles of Economics*, you will find new features that engage the students in economic inquiry by taking selected topics a step further. Our features include:

Bring It Home: This added feature is a brief case study, specific to each chapter, which connects the chapter's main topic to the real word. It is broken up into two parts: the first at the beginning of the chapter (in the Intro module) and the second at chapter's end, when students have learned what's necessary to understand the case and "bring home" the chapter's core concepts.
Work It Out: This added feature asks students to work through a generally analytical or computational problem, and guides them step-by-step to find out how its solution is derived.
Clear It Up: This boxed feature, which includes pre-existing features from Taylor's text, addresses common student misconceptions about

the content. Clear It Ups are usually deeper explanations of something in the main body of the text. Each CIU starts with a question. The rest of the feature explains the answer.
Link It Up: This added feature is a very brief introduction to a website that is pertinent to students' understanding and enjoyment of the topic at hand.

Questions for Each Level of Learning

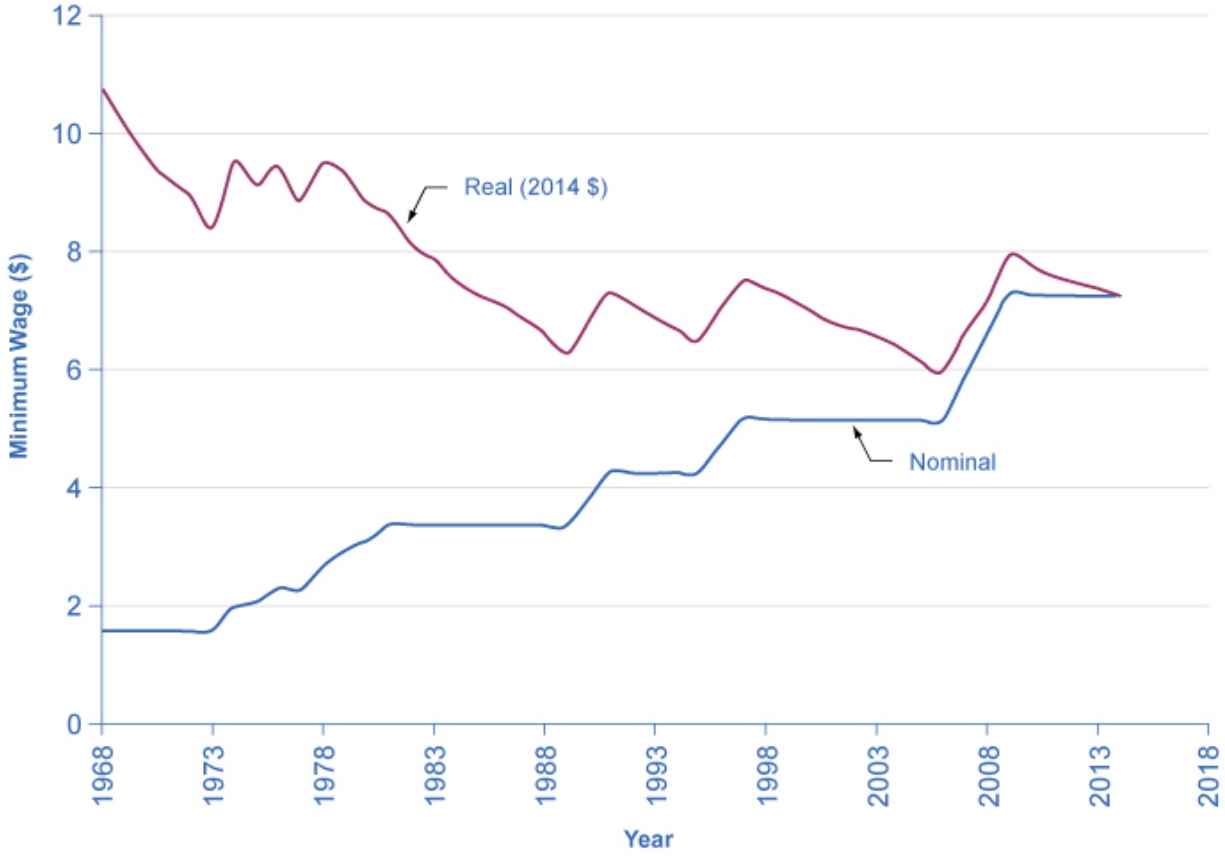
The OpenStax version of *Principles of Economics* further expands on Taylor's original end of chapter materials by offering four types of end-of-module questions for students.

Self-Checks: Are analytical self-assessment questions that appear at the end of each module. They "click–to-reveal" an answer in the web view so students can check their understanding before moving on to the next module. Self-Check questions are not simple look-up questions. They push the student to think a bit beyond what is said in the text. Self-Check questions are designed for formative (rather than summative) assessment. The questions and answers are explained so that students feel like they are being walked through the problem.
Review Questions: Have been retained from Taylor's version, and are simple recall questions from the chapter and are in open-response format (not multiple choice or true/false). The answers can be looked up in the text.
Critical Thinking Questions: Are new higher-level, conceptual questions that ask students to *demonstrate their understanding by applying* what they have learned in different contexts. They ask for outside-the-box thinking, for *reasoning* about the concepts. They push the student to places they wouldn't have thought of going themselves.
Problems: Are exercises that give students additional practice working with the analytic and computational concepts in the module.

Updated Art

Principles of Economics includes an updated art program to better inform today's student, providing the latest data on covered topics.

U.S. Minimum Wage and Inflation



After adjusting for inflation, the federal minimum wage dropped more than 30 percent from 1967 to 2010, even though the nominal figure climbed from $1.40 to $7.25 per hour. Increases in the minimum wage in 2007, 2008, and 2009 kept the decline from being worse—as it would have been if the wage had remained the same as it did from 1997 through 2006. (Sources: http://www.dol.gov/whd/minwage/chart.htm; http://data.bls.gov/cgi-bin/surveymost?cu)

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Timothy Taylor has been writing and teaching about economics for 30 years, and is the Managing Editor of the *Journal of Economic Perspectives*, a post he's held since 1986. He has been a lecturer for The Teaching Company, the University of Minnesota, and the Hubert H. Humphrey Institute of Public Affairs, where students voted him Teacher of the Year in 1997. His writings include numerous pieces for journals such as the *Milken Institute Review* and *The Public Interest*, and he has been an editor on many projects, most notably for the Brookings Institution and the World Bank, where he was Chief Outside Editor for the *World Development Report 1999/2000, Entering the 21st Century: The Changing Development Landscape*. He also blogs four to five times per week at http://conversableeconomist.blogspot.com. Timothy Taylor lives near Minneapolis with his wife Kimberley and their three children.

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Steven Greenlaw has been teaching principles of economics for more than 30 years. In 1999, he received the Grellet C. Simpson Award for Excellence in Undergraduate Teaching at the University of Mary Washington. He is the author of *Doing Economics: A Guide to Doing and Understanding Economic Research*, as well as a variety of articles on economics pedagogy and instructional technology, published in the *Journal of Economic Education*, the *International Review of Economic Education*, and other outlets. He wrote the module on Quantitative Writing for *Starting Point: Teaching and Learning Economics*, the web portal on best practices in teaching economics. Steven Greenlaw lives in Alexandria, Virginia with his wife Kathy and their three children.

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Ancillaries

OpenStax projects offer an array of ancillaries for students and instructors. Please visit http://openstaxcollege.org and view the learning resources for this title.

Introduction
class="introduction"
Do You Use Facebook?

Economics is greatly impacted by how well information travels through society. Today, social media giants Twitter, Facebook, and Instagram are major forces on the information super highway. (Credit: Johan Larsson/Flickr)



Note:

Decisions ... Decisions in the Social Media Age

To post or not to post? Every day we are faced with a myriad of decisions, from what to have for breakfast, to which route to take to class, to the more complex—“Should I double major and add possibly another semester of study to my education?” Our response to these choices depends on the information we have available at any given moment; information economists call “imperfect” because we rarely have all the data we need to make perfect decisions. Despite the lack of perfect information, we still make hundreds of decisions a day.

And now, we have another avenue in which to gather information—social media. Outlets like Facebook and Twitter are altering the process by which we make choices, how we spend our time, which movies we see, which products we buy, and more. How many of you chose a university without checking out its Facebook page or Twitter stream first for information and feedback?

As you will see in this course, what happens in economics is affected by how well and how fast information is disseminated through a society, such as how quickly information travels through Facebook. “Economists love nothing better than when deep and liquid markets operate under conditions of perfect information,” says Jessica Irvine, National Economics Editor for News Corp Australia.
This leads us to the topic of this chapter, an introduction to the world of making decisions, processing information, and understanding behavior in markets —the world of economics. Each chapter in this book will start with a discussion about current (or sometimes past) events and revisit it at chapter’s end—to “bring home” the concepts in play.

Note:
Introduction
In this chapter, you will learn about:

- What Is Economics, and Why Is It Important?
- Microeconomics and Macroeconomics
- How Economists Use Theories and Models to Understand Economic Issues
- How Economies Can Be Organized: An Overview of Economic Systems

What is economics and why should you spend your time learning it? After all, there are other disciplines you could be studying, and other ways you could be spending your time. As the Bring it Home feature just mentioned, making choices is at the heart of what economists study, and your decision to take this course is as much as economic decision as anything else.

Economics is probably not what you think. It is not primarily about money or finance. It is not primarily about business. It is not mathematics. What is it then? It is both a subject area and a way of viewing the world.

What Is Economics, and Why Is It Important?

By the end of this section, you will be able to:

- Discuss the importance of studying economics
- Explain the relationship between production and division of labor
- Evaluate the significance of scarcity

Economics is the study of how humans make decisions in the face of scarcity. These can be individual decisions, family decisions, business decisions or societal decisions. If you look around carefully, you will see that scarcity is a fact of life. **Scarcity** means that human wants for goods, services and resources exceed what is available. Resources, such as labor, tools, land, and raw materials are necessary to produce the goods and services we want but they exist in limited supply. Of course, the ultimate scarce resource is time- everyone, rich or poor, has just 24 hours in the day to try to acquire the goods they want. At any point in time, there is only a finite amount of resources available.

Think about it this way: In 2015 the labor force in the United States contained over 158.6 million workers, according to the U.S. Bureau of Labor Statistics. Similarly, the total area of the United States is 3,794,101 square miles. These are large numbers for such crucial resources, however, they are limited. Because these resources are limited, so are the numbers of goods and services we produce with them. Combine this with the fact that human wants seem to be virtually infinite, and you can see why scarcity is a problem.

Scarcity of Resources



Homeless people are a stark reminder that scarcity of resources is real. (Credit: “daveynin”/Flickr Creative Commons)

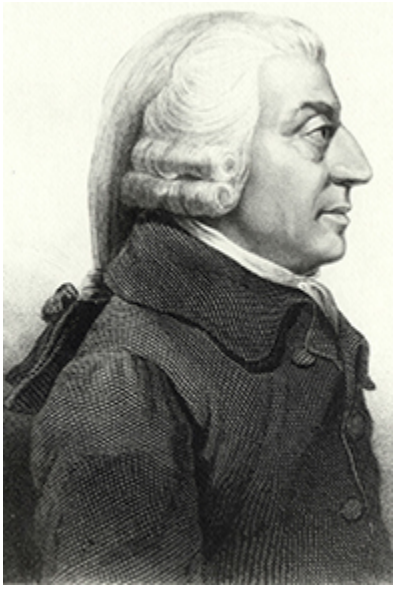
If you still do not believe that scarcity is a problem, consider the following: Does everyone need food to eat? Does everyone need a decent place to live? Does everyone have access to healthcare? In every country in the world, there are people who are hungry, homeless (for example, those who call park benches their beds, as shown in [link]), and in need of healthcare, just to focus on a few critical goods and services. Why is this the case? It is because of scarcity. Let’s delve into the concept of scarcity a little deeper, because it is crucial to understanding economics.

The Problem of Scarcity

Think about all the things you consume: food, shelter, clothing, transportation, healthcare, and entertainment. How do you acquire those items? You do not produce them yourself. You buy them. How do you afford the things you buy? You work for pay. Or if you do not, someone else does on your behalf. Yet most of us never have enough to buy all the things we want. This is because of scarcity. So how do we solve it?

Note:
Visit this website to read about how the United States is dealing with scarcity in resources.

Every society, at every level, must make choices about how to use its resources. Families must decide whether to spend their money on a new car or a fancy vacation. Towns must choose whether to put more of the budget into police and fire protection or into the school system. Nations must decide whether to devote more funds to national defense or to protecting the environment. In most cases, there just isn't enough money in the budget to do everything. So why do we not each just produce all of the things we consume? The simple answer is most of us do not know how, but that is not the main reason. (When you study economics, you will discover that the obvious choice is not always the right answer—or at least the complete answer. Studying economics teaches you to think in a different of way.) Think back to pioneer days, when individuals knew how to do so much more than we do today, from building their homes, to growing their crops, to hunting for food, to repairing their equipment. Most of us do not know how to do all—or any—of those things. It is not because we could not learn. Rather, we do not have to. The reason why is something called *the division and specialization of labor*, a production innovation first put forth by Adam Smith, [link], in his book, *The Wealth of Nations*.
Adam Smith



Adam Smith introduced the idea of dividing labor into discrete tasks. (Credit: Wikimedia Commons)

The Division of and Specialization of Labor

The formal study of economics began when Adam Smith (1723–1790) published his famous book *The Wealth of Nations* in 1776. Many authors had written on economics in the centuries before Smith, but he was the first to address the subject in a comprehensive way. In the first chapter, Smith introduces the **division of labor**, which means that the way a good or service is produced is divided into a number of tasks that are performed by different workers, instead of all the tasks being done by the same person.

To illustrate the division of labor, Smith counted how many tasks went into making a pin: drawing out a piece of wire, cutting it to the right length, straightening it, putting a head on one end and a point on the other, and

packaging pins for sale, to name just a few. Smith counted 18 distinct tasks that were often done by different people—all for a pin, believe it or not!

Modern businesses divide tasks as well. Even a relatively simple business like a restaurant divides up the task of serving meals into a range of jobs like top chef, sous chefs, less-skilled kitchen help, servers to wait on the tables, a greeter at the door, janitors to clean up, and a business manager to handle paychecks and bills—not to mention the economic connections a restaurant has with suppliers of food, furniture, kitchen equipment, and the building where it is located. A complex business like a large manufacturing factory, such as the shoe factory shown in [link], or a hospital can have hundreds of job classifications.

Division of Labor



Workers on an assembly line are an example of the divisions of labor. (Credit: Nina Hale/Flickr Creative Commons)

Why the Division of Labor Increases Production

When the tasks involved with producing a good or service are divided and subdivided, workers and businesses can produce a greater quantity of output. In his observations of pin factories, Smith observed that one worker

alone might make 20 pins in a day, but that a small business of 10 workers (some of whom would need to do two or three of the 18 tasks involved with pin-making), could make 48,000 pins in a day. How can a group of workers, each specializing in certain tasks, produce so much more than the same number of workers who try to produce the entire good or service by themselves? Smith offered three reasons.

First, **specialization** in a particular small job allows workers to focus on the parts of the production process where they have an advantage. (In later chapters, we will develop this idea by discussing comparative advantage.) People have different skills, talents, and interests, so they will be better at some jobs than at others. The particular advantages may be based on educational choices, which are in turn shaped by interests and talents. Only those with medical degrees qualify to become doctors, for instance. For some goods, specialization will be affected by geography—it is easier to be a wheat farmer in North Dakota than in Florida, but easier to run a tourist hotel in Florida than in North Dakota. If you live in or near a big city, it is easier to attract enough customers to operate a successful dry cleaning business or movie theater than if you live in a sparsely populated rural area. Whatever the reason, if people specialize in the production of what they do best, they will be more productive than if they produce a combination of things, some of which they are good at and some of which they are not.

Second, workers who specialize in certain tasks often learn to produce more quickly and with higher quality. This pattern holds true for many workers, including assembly line laborers who build cars, stylists who cut hair, and doctors who perform heart surgery. In fact, specialized workers often know their jobs well enough to suggest innovative ways to do their work faster and better.

A similar pattern often operates within businesses. In many cases, a business that focuses on one or a few products (sometimes called its “core competency”) is more successful than firms that try to make a wide range of products.

Third, specialization allows businesses to take advantage of **economies of scale**, which means that for many goods, as the level of production increases, the average cost of producing each individual unit declines. For

example, if a factory produces only 100 cars per year, each car will be quite expensive to make on average. However, if a factory produces 50,000 cars each year, then it can set up an assembly line with huge machines and workers performing specialized tasks, and the average cost of production per car will be lower. The ultimate result of workers who can focus on their preferences and talents, learn to do their specialized jobs better, and work in larger organizations is that society as a whole can produce and consume far more than if each person tried to produce all of their own goods and services. The division and specialization of labor has been a force against the problem of scarcity.

Trade and Markets

Specialization only makes sense, though, if workers can use the pay they receive for doing their jobs to purchase the other goods and services that they need. In short, specialization requires trade.

You do not have to know anything about electronics or sound systems to play music—you just buy an iPod or MP3 player, download the music and listen. You do not have to know anything about artificial fibers or the construction of sewing machines if you need a jacket—you just buy the jacket and wear it. You do not need to know anything about internal combustion engines to operate a car—you just get in and drive. Instead of trying to acquire all the knowledge and skills involved in producing all of the goods and services that you wish to consume, the market allows you to learn a specialized set of skills and then use the pay you receive to buy the goods and services you need or want. This is how our modern society has evolved into a strong economy.

Why Study Economics?

Now that we have gotten an overview on what economics studies, let’s quickly discuss why you are right to study it. Economics is not primarily a collection of facts to be memorized, though there are plenty of important concepts to be learned. Instead, economics is better thought of as a collection of questions to be answered or puzzles to be worked out. Most important, economics provides the tools to work out those puzzles. If you

have yet to be been bitten by the economics “bug,” there are other reasons why you should study economics.

- Virtually every major problem facing the world today, from global warming, to world poverty, to the conflicts in Syria, Afghanistan, and Somalia, has an economic dimension. If you are going to be part of solving those problems, you need to be able to understand them. Economics is crucial.
- It is hard to overstate the importance of economics to good citizenship. You need to be able to vote intelligently on budgets, regulations, and laws in general. When the U.S. government came close to a standstill at the end of 2012 due to the “fiscal cliff,” what were the issues involved? Did you know?
- A basic understanding of economics makes you a well-rounded thinker. When you read articles about economic issues, you will understand and be able to evaluate the writer’s argument. When you hear classmates, co-workers, or political candidates talking about economics, you will be able to distinguish between common sense and nonsense. You will find new ways of thinking about current events and about personal and business decisions, as well as current events and politics.

The study of economics does not dictate the answers, but it can illuminate the different choices.

Key Concepts and Summary

Economics seeks to solve the problem of scarcity, which is when human wants for goods and services exceed the available supply. A modern economy displays a division of labor, in which people earn income by specializing in what they produce and then use that income to purchase the products they need or want. The division of labor allows individuals and firms to specialize and to produce more for several reasons: a) It allows the agents to focus on areas of advantage due to natural factors and skill levels; b) It encourages the agents to learn and invent; c) It allows agents to take advantage of economies of scale. Division and specialization of labor only work when individuals can purchase what they do not produce in markets.

Learning about economics helps you understand the major problems facing the world today, prepares you to be a good citizen, and helps you become a well-rounded thinker.

Self-Check Questions

Exercise:

Problem: What is scarcity? Can you think of two causes of scarcity?

Solution:

Scarcity means human wants for goods and services exceed the available supply. Supply is limited because resources are limited. Demand, however, is virtually unlimited. Whatever the supply, it seems human nature to want more.

Exercise:

Problem:

Residents of the town of Smithfield like to consume hams, but each ham requires 10 people to produce it and takes a month. If the town has a total of 100 people, what is the maximum amount of ham the residents can consume in a month?

Solution:

100 people / 10 people per ham = a maximum of 10 hams per month if all residents produce ham. Since consumption is limited by production, the maximum number of hams residents could consume per month is 10.

Exercise:

Problem:

A consultant works for $200 per hour. She likes to eat vegetables, but is not very good at growing them. Why does it make more economic sense for her to spend her time at the consulting job and shop for her vegetables?

Solution:

She is very productive at her consulting job, but not very productive growing vegetables. Time spent consulting would produce far more income than it what she could save growing her vegetables using the same amount of time. So on purely economic grounds, it makes more sense for her to maximize her income by applying her labor to what she does best (i.e. specialization of labor).

Exercise:

Problem:

A computer systems engineer could paint his house, but it makes more sense for him to hire a painter to do it. Explain why.

Solution:

The engineer is better at computer science than at painting. Thus, his time is better spent working for pay at his job and paying a painter to paint his house. Of course, this assumes he does not paint his house for fun!

Review Questions

Exercise:

Problem:

Give the three reasons that explain why the division of labor increases an economy’s level of production.

Exercise:

Problem: What are three reasons to study economics?

Critical Thinking Questions

Exercise:

Problem:

Suppose you have a team of two workers: one is a baker and one is a chef. Explain why the kitchen can produce more meals in a given period of time if each worker specializes in what they do best than if each worker tries to do everything from appetizer to dessert.

Exercise:

Problem: Why would division of labor without trade not work?

Exercise:

Problem:

Can you think of any examples of *free* goods, that is, goods or services that are not scarce?

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Williamson, Lisa. “US Labor Market in 2012.” *Bureau of Labor Statistics*. Accessed December 1, 2013. http://www.bls.gov/opub/mlr/2013/03/art1full.pdf.

Glossary

division of labor
: the way in which the work required to produce a good or service is divided into tasks performed by different workers

economics
: the study of how humans make choices under conditions of scarcity

economies of scale
: when the average cost of producing each individual unit declines as total output increases

scarcity
: when human wants for goods and services exceed the available supply

specialization
: when workers or firms focus on particular tasks for which they are well-suited within the overall production process

Microeconomics and Macroeconomics

By the end of this section, you will be able to:

- Describe microeconomics
- Describe macroeconomics
- Contrast monetary policy and fiscal policy

Economics is concerned with the well-being of *all* people, including those with jobs and those without jobs, as well as those with high incomes and those with low incomes. Economics acknowledges that production of useful goods and services can create problems of environmental pollution. It explores the question of how investing in education helps to develop workers' skills. It probes questions like how to tell when big businesses or big labor unions are operating in a way that benefits society as a whole and when they are operating in a way that benefits their owners or members at the expense of others. It looks at how government spending, taxes, and regulations affect decisions about production and consumption.

It should be clear by now that economics covers a lot of ground. That ground can be divided into two parts: **Microeconomics** focuses on the actions of individual agents within the economy, like households, workers, and businesses; **Macroeconomics** looks at the economy as a whole. It focuses on broad issues such as growth of production, the number of unemployed people, the inflationary increase in prices, government deficits, and levels of exports and imports. Microeconomics and macroeconomics are not separate subjects, but rather complementary perspectives on the overall subject of the economy.

To understand why both microeconomic and macroeconomic perspectives are useful, consider the problem of studying a biological ecosystem like a lake. One person who sets out to study the lake might focus on specific topics: certain kinds of algae or plant life; the characteristics of particular fish or snails; or the trees surrounding the lake. Another person might take an overall view and instead consider the entire ecosystem of the lake from top to bottom; what eats what, how the system stays in a rough balance, and what environmental stresses affect this balance. Both approaches are useful, and both examine the same lake, but the viewpoints are different. In a

similar way, both microeconomics and macroeconomics study the same economy, but each has a different viewpoint.

Whether you are looking at lakes or economics, the micro and the macro insights should blend with each other. In studying a lake, the micro insights about particular plants and animals help to understand the overall food chain, while the macro insights about the overall food chain help to explain the environment in which individual plants and animals live.

In economics, the micro decisions of individual businesses are influenced by whether the macroeconomy is healthy; for example, firms will be more likely to hire workers if the overall economy is growing. In turn, the performance of the macroeconomy ultimately depends on the microeconomic decisions made by individual households and businesses.

Microeconomics

What determines how households and individuals spend their budgets? What combination of goods and services will best fit their needs and wants, given the budget they have to spend? How do people decide whether to work, and if so, whether to work full time or part time? How do people decide how much to save for the future, or whether they should borrow to spend beyond their current means?

What determines the products, and how many of each, a firm will produce and sell? What determines what prices a firm will charge? What determines how a firm will produce its products? What determines how many workers it will hire? How will a firm finance its business? When will a firm decide to expand, downsize, or even close? In the microeconomic part of this book, we will learn about the theory of consumer behavior and the theory of the firm.

Macroeconomics

What determines the level of economic activity in a society? In other words, what determines how many goods and services a nation actually produces? What determines how many jobs are available in an economy? What

determines a nation’s standard of living? What causes the economy to speed up or slow down? What causes firms to hire more workers or to lay workers off? Finally, what causes the economy to grow over the long term?

An economy's macroeconomic health can be defined by a number of goals: growth in the standard of living, low unemployment, and low inflation, to name the most important. How can macroeconomic policy be used to pursue these goals? **Monetary policy**, which involves policies that affect bank lending, interest rates, and financial capital markets, is conducted by a nation’s central bank. For the United States, this is the Federal Reserve. **Fiscal policy**, which involves government spending and taxes, is determined by a nation’s legislative body. For the United States, this is the Congress and the executive branch, which originates the federal budget. These are the main tools the government has to work with. Americans tend to expect that government can fix whatever economic problems we encounter, but to what extent is that expectation realistic? These are just some of the issues that will be explored in the macroeconomic chapters of this book.

Key Concepts and Summary

Microeconomics and macroeconomics are two different perspectives on the economy. The microeconomic perspective focuses on parts of the economy: individuals, firms, and industries. The macroeconomic perspective looks at the economy as a whole, focusing on goals like growth in the standard of living, unemployment, and inflation. Macroeconomics has two types of policies for pursuing these goals: monetary policy and fiscal policy.

Self-Check Questions

Exercise:

Problem:

What would be another example of a “system” in the real world that could serve as a metaphor for micro and macroeconomics?

Solution:

There are many physical systems that would work, for example, the study of planets (micro) in the solar system (macro), or solar systems (micro) in the galaxy (macro).

Review Questions

Exercise:

Problem:

What is the difference between microeconomics and macroeconomics?

Exercise:

Problem: What are examples of individual economic agents?

Exercise:

Problem: What are the three main goals of macroeconomics?

Critical Thinking Questions

Exercise:

Problem:

A balanced federal budget and a balance of trade are considered secondary goals of macroeconomics, while growth in the standard of living (for example) is considered a primary goal. Why do you think that is so?

Exercise:

Problem:

Macroeconomics is an aggregate of what happens at the microeconomic level. Would it be possible for what happens at the macro level to differ from how economic agents would react to some stimulus at the micro level? *Hint:* Think about the behavior of crowds.

Glossary

fiscal policy
: economic policies that involve government spending and taxes

macroeconomics
: the branch of economics that focuses on broad issues such as growth, unemployment, inflation, and trade balance.

microeconomics
: the branch of economics that focuses on actions of particular agents within the economy, like households, workers, and business firms

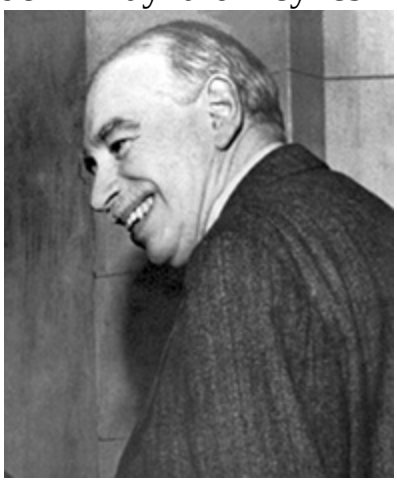
monetary policy
: policy that involves altering the level of interest rates, the availability of credit in the economy, and the extent of borrowing

How Economists Use Theories and Models to Understand Economic Issues

By the end of this section, you will be able to:

- Interpret a circular flow diagram
- Explain the importance of economic theories and models
- Describe goods and services markets and labor markets

John Maynard Keynes



One of the most influential economists in modern times was John Maynard Keynes. (Credit: Wikimedia Commons)

John Maynard Keynes (1883–1946), one of the greatest economists of the twentieth century, pointed out that economics is not just a subject area but also a way of thinking. Keynes, shown in [link], famously wrote in the introduction to a fellow economist's book: "[Economics] is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which

helps its possessor to draw correct conclusions.” In other words, economics teaches you how to think, not what to think.

Note:
Watch this video about John Maynard Keynes and his influence on economics.

Economists see the world through a different lens than anthropologists, biologists, classicists, or practitioners of any other discipline. They analyze issues and problems with economic theories that are based on particular assumptions about human behavior, that are different than the assumptions an anthropologist or psychologist might use. A **theory** is a simplified representation of how two or more variables interact with each other. The purpose of a theory is to take a complex, real-world issue and simplify it down to its essentials. If done well, this enables the analyst to understand the issue and any problems around it. A good theory is simple enough to be understood, while complex enough to capture the key features of the object or situation being studied.

Sometimes economists use the term **model** instead of theory. Strictly speaking, a theory is a more abstract representation, while a model is more applied or empirical representation. Models are used to test theories, but for this course we will use the terms interchangeably.

For example, an architect who is planning a major office building will often build a physical model that sits on a tabletop to show how the entire city

block will look after the new building is constructed. Companies often build models of their new products, which are more rough and unfinished than the final product will be, but can still demonstrate how the new product will work.

A good model to start with in economics is the **circular flow diagram**, which is shown in [link]. It pictures the economy as consisting of two groups—households and firms—that interact in two markets: the **goods and services market** in which firms sell and households buy and the **labor market** in which households sell labor to business firms or other employees.

The Circular Flow Diagram



The circular flow diagram shows how households and firms interact in the goods and services market, and in the labor market. The direction of the arrows shows that in the goods and services market, households receive goods and services and pay firms for them. In the labor market, households provide labor and receive payment from firms through wages, salaries, and benefits.

Of course, in the real world, there are many different markets for goods and services and markets for many different types of labor. The circular flow diagram simplifies this to make the picture easier to grasp. In the diagram, firms produce goods and services, which they sell to households in return for revenues. This is shown in the outer circle, and represents the two sides of the product market (for example, the market for goods and services) in which households demand and firms supply. Households sell their labor as workers to firms in return for wages, salaries and benefits. This is shown in the inner circle and represents the two sides of the labor market in which households supply and firms demand.

This version of the circular flow model is stripped down to the essentials, but it has enough features to explain how the product and labor markets work in the economy. We could easily add details to this basic model if we wanted to introduce more real-world elements, like financial markets, governments, and interactions with the rest of the globe (imports and exports).

Economists carry a set of theories in their heads like a carpenter carries around a toolkit. When they see an economic issue or problem, they go through the theories they know to see if they can find one that fits. Then they use the theory to derive insights about the issue or problem. In economics, theories are expressed as diagrams, graphs, or even as mathematical equations. (Do not worry. In this course, we will mostly use graphs.) Economists do not figure out the answer to the problem first and then draw the graph to illustrate. Rather, they use the graph of the theory to help them figure out the answer. Although at the introductory level, you can sometimes figure out the right answer without applying a model, if you keep studying economics, before too long you will run into issues and problems that you will need to graph to solve. Both micro and macroeconomics are explained in terms of theories and models. The most well-known theories are probably those of supply and demand, but you will learn a number of others.

Key Concepts and Summary

Economists analyze problems differently than do other disciplinary experts. The main tools economists use are economic theories or models. A theory is not an illustration of the answer to a problem. Rather, a theory is a tool for determining the answer.

Self-Check Questions

Exercise:

Problem:

Suppose we extend the circular flow model to add imports and exports. Copy the circular flow diagram onto a sheet of paper and then add a foreign country as a third agent. Draw a rough sketch of the flows of imports, exports, and the payments for each on your diagram.

Solution:

Draw a box outside the original circular flow to represent the foreign country. Draw an arrow from the foreign country to firms, to represents imports. Draw an arrow in the reverse direction representing payments for imports. Draw an arrow from firms to the foreign country to represent exports. Draw an arrow in the reverse direction to represent payments for imports.

Exercise:

Problem:

What is an example of a problem in the world today, not mentioned in the chapter, that has an economic dimension?

Solution:

There are many such problems. Consider the AIDS epidemic. Why are so few AIDS patients in Africa and Southeast Asia treated with the same drugs that are effective in the United States and Europe? It is because neither those patients nor the countries in which they live have the resources to purchase the same drugs.

Review Questions

Exercise:

Problem: How did John Maynard Keynes define economics?

Exercise:

Problem:

Are households primarily buyers or sellers in the goods and services market? In the labor market?

Exercise:

Problem:

Are firms primarily buyers or sellers in the goods and services market? In the labor market?

Critical Thinking Questions

Exercise:

Problem:

Why is it unfair or meaningless to criticize a theory as “unrealistic?”

Exercise:

Problem:

Suppose, as an economist, you are asked to analyze an issue unlike anything you have ever done before. Also, suppose you do not have a specific model for analyzing that issue. What should you do? *Hint:* What would a carpenter do in a similar situation?

Glossary

circular flow diagram

a diagram that views the economy as consisting of households and firms interacting in a goods and services market and a labor market

goods and services market
: a market in which firms are sellers of what they produce and households are buyers

labor market
: the market in which households sell their labor as workers to business firms or other employers

model
: see theory

theory
: a representation of an object or situation that is simplified while including enough of the key features to help us understand the object or situation

Introduction to Demand and Supply
class="introduction"
Farmer’s Market

Organic vegetables and fruits that are grown and sold within a specific geographical region should, in theory, cost less than conventional produce because the transportation costs are less. That is not, however, usually the case. (Credit: modification of work by Natalie Maynor/Flickr Creative Commons)



Note:
Why Can We Not Get Enough of Organic?
Organic food is increasingly popular, not just in the United States, but worldwide. At one time, consumers had to go to specialty stores or farmer's markets to find organic produce. Now it is available in most grocery stores. In short, organic is part of the mainstream.
Ever wonder why organic food costs more than conventional food? Why, say, does an organic Fuji apple cost $1.99 a pound, while its conventional counterpart costs $1.49 a pound? The same price relationship is true for just about every organic product on the market. If many organic foods are locally grown, would they not take less time to get to market and therefore be cheaper? What are the forces that keep those prices from coming down? Turns out those forces have a lot to do with this chapter's topic: demand and supply.

Note:
Introduction to Demand and Supply
In this chapter, you will learn about:

- Demand, Supply, and Equilibrium in Markets for Goods and Services
- Shifts in Demand and Supply for Goods and Services
- Changes in Equilibrium Price and Quantity: The Four-Step Process
- Price Ceilings and Price Floors

An auction bidder pays thousands of dollars for a dress Whitney Houston wore. A collector spends a small fortune for a few drawings by John Lennon. People usually react to purchases like these in two ways: their jaw drops because they think these are high prices to pay for such goods or they think these are rare, desirable items and the amount paid seems right.

Note:
Visit this website to read a list of bizarre items that have been purchased for their ties to celebrities. These examples represent an interesting facet of demand and supply.



When economists talk about prices, they are less interested in making judgments than in gaining a practical understanding of what determines prices and why prices change. Consider a price most of us contend with weekly: that of a gallon of gas. Why was the average price of gasoline in the United States $3.71 per gallon in June 2014? Why did the price for gasoline fall sharply to $2.07 per gallon by January 2015? To explain these price movements, economists focus on the determinants of what gasoline buyers are willing to pay and what gasoline sellers are willing to accept.

As it turns out, the price of gasoline in June of any given year is nearly always higher than the price in January of that same year; over recent decades, gasoline prices in midsummer have averaged about 10 cents per gallon more than their midwinter low. The likely reason is that people drive more in the summer, and are also willing to pay more for gas, but that does not explain how steeply gas prices fell. Other factors were at work during those six months, such as increases in supply and decreases in the demand for crude oil.

This chapter introduces the economic model of demand and supply—one of the most powerful models in all of economics. The discussion here begins by examining how demand and supply determine the price and the quantity sold in markets for goods and services, and how changes in demand and supply lead to changes in prices and quantities.

Demand, Supply, and Equilibrium in Markets for Goods and Services

By the end of this section, you will be able to:

- Explain demand, quantity demanded, and the law of demand
- Identify a demand curve and a supply curve
- Explain supply, quantity supply, and the law of supply
- Explain equilibrium, equilibrium price, and equilibrium quantity

First let's first focus on what economists mean by demand, what they mean by supply, and then how demand and supply interact in a market.

Demand for Goods and Services

Economists use the term **demand** to refer to the amount of some good or service consumers are willing and able to purchase at each price. Demand is based on needs and wants—a consumer may be able to differentiate between a need and a want, but from an economist's perspective they are the same thing. Demand is also based on ability to pay. If you cannot pay for it, you have no effective demand.

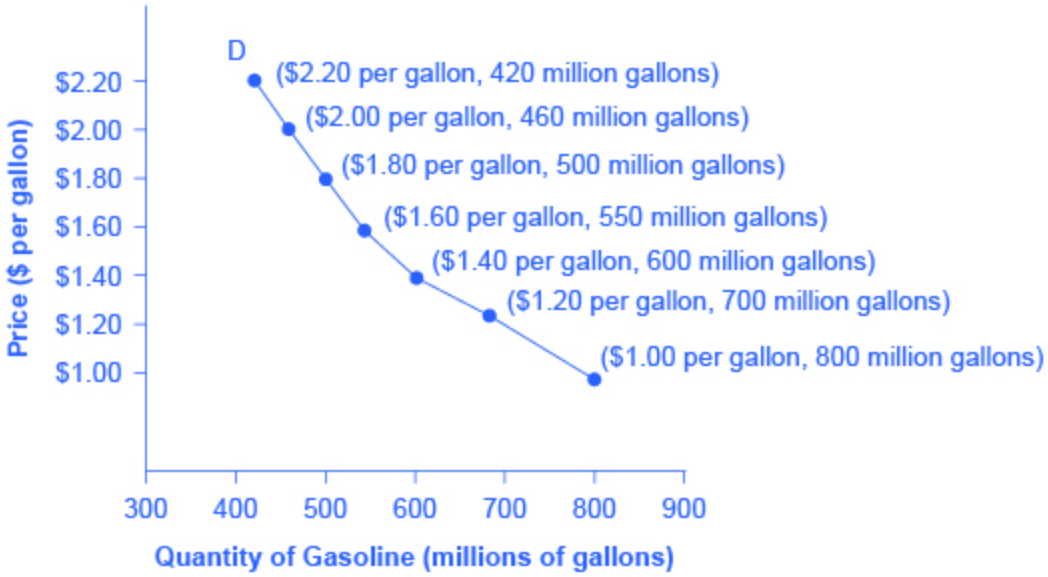
What a buyer pays for a unit of the specific good or service is called **price**. The total number of units purchased at that price is called the **quantity demanded**. A rise in price of a good or service almost always decreases the quantity demanded of that good or service. Conversely, a fall in price will increase the quantity demanded. When the price of a gallon of gasoline goes up, for example, people look for ways to reduce their consumption by combining several errands, commuting by carpool or mass transit, or taking weekend or vacation trips closer to home. Economists call this inverse relationship between price and quantity demanded the **law of demand**. The law of demand assumes that all other variables that affect demand (to be explained in the next module) are held constant.

An example from the market for gasoline can be shown in the form of a table or a graph. A table that shows the quantity demanded at each price, such as [link], is called a **demand schedule**. Price in this case is measured in dollars per gallon of gasoline. The quantity demanded is measured in

millions of gallons over some time period (for example, per day or per year) and over some geographic area (like a state or a country). A **demand curve** shows the relationship between price and quantity demanded on a graph like [link], with quantity on the horizontal axis and the price per gallon on the vertical axis. (Note that this is an exception to the normal rule in mathematics that the independent variable (x) goes on the horizontal axis and the dependent variable (y) goes on the vertical. Economics is not math.)

The demand schedule shown by [link] and the demand curve shown by the graph in [link] are two ways of describing the same relationship between price and quantity demanded.

A Demand Curve for Gasoline



The demand schedule shows that as price rises, quantity demanded decreases, and vice versa. These points are then graphed, and the line connecting them is the demand curve (D). The downward slope of the demand curve again illustrates the law of demand—the inverse relationship between prices and quantity demanded.

Price (per gallon)	Quantity Demanded (millions of gallons)
$1.00	800
$1.20	700
$1.40	600
$1.60	550
$1.80	500
$2.00	460
$2.20	420

Price and Quantity Demanded of Gasoline

Demand curves will appear somewhat different for each product. They may appear relatively steep or flat, or they may be straight or curved. Nearly all demand curves share the fundamental similarity that they slope down from left to right. So demand curves embody the law of demand: As the price increases, the quantity demanded decreases, and conversely, as the price decreases, the quantity demanded increases.

Confused about these different types of demand? Read the next Clear It Up feature.

Note:
Is demand the same as quantity demanded?
In economic terminology, demand is not the same as quantity demanded. When economists talk about demand, they mean the relationship between a range of prices and the quantities demanded at those prices, as illustrated by a demand curve or a demand schedule. When economists talk about quantity demanded, they mean only a certain point on the demand curve, or

one quantity on the demand schedule. In short, demand refers to the curve and quantity demanded refers to the (specific) point on the curve.

Supply of Goods and Services

When economists talk about **supply**, they mean the amount of some good or service a producer is willing to supply at each price. Price is what the producer receives for selling one unit of a good or service. A rise in price almost always leads to an increase in the **quantity supplied** of that good or service, while a fall in price will decrease the quantity supplied. When the price of gasoline rises, for example, it encourages profit-seeking firms to take several actions: expand exploration for oil reserves; drill for more oil; invest in more pipelines and oil tankers to bring the oil to plants where it can be refined into gasoline; build new oil refineries; purchase additional pipelines and trucks to ship the gasoline to gas stations; and open more gas stations or keep existing gas stations open longer hours. Economists call this positive relationship between price and quantity supplied—that a higher price leads to a higher quantity supplied and a lower price leads to a lower quantity supplied—the **law of supply**. The law of supply assumes that all other variables that affect supply (to be explained in the next module) are held constant.

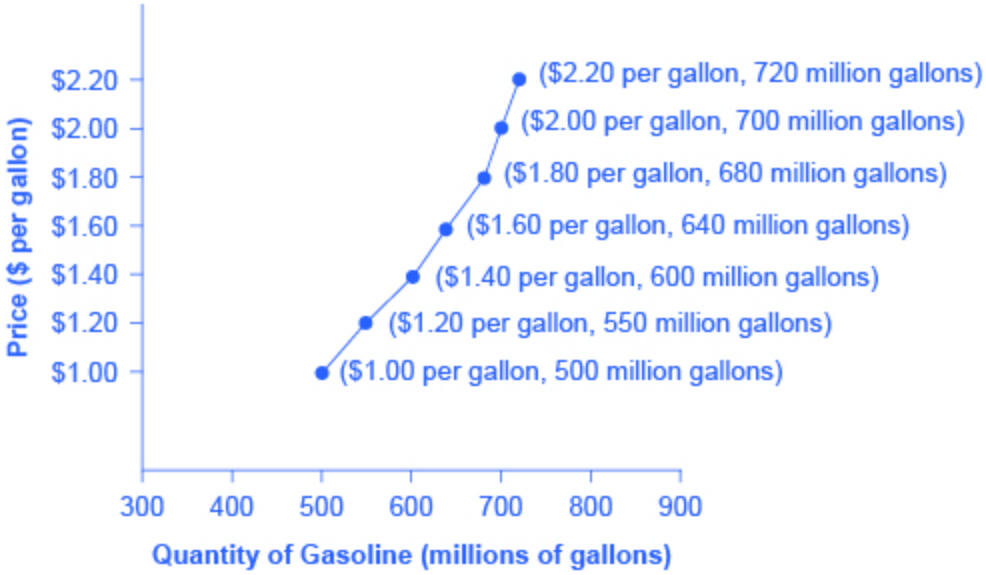
Still unsure about the different types of supply? See the following Clear It Up feature.

Note:
Is supply the same as quantity supplied?
In economic terminology, supply is not the same as quantity supplied. When economists refer to supply, they mean the relationship between a range of prices and the quantities supplied at those prices, a relationship that can be illustrated with a supply curve or a supply schedule. When economists refer to quantity supplied, they mean only a certain point on the supply curve, or one quantity on the supply schedule. In short, supply

refers to the curve and quantity supplied refers to the (specific) point on the curve.

[link] illustrates the law of supply, again using the market for gasoline as an example. Like demand, supply can be illustrated using a table or a graph. A **supply schedule** is a table, like [link], that shows the quantity supplied at a range of different prices. Again, price is measured in dollars per gallon of gasoline and quantity supplied is measured in millions of gallons. A **supply curve** is a graphic illustration of the relationship between price, shown on the vertical axis, and quantity, shown on the horizontal axis. The supply schedule and the supply curve are just two different ways of showing the same information. Notice that the horizontal and vertical axes on the graph for the supply curve are the same as for the demand curve.

A Supply Curve for Gasoline



The supply schedule is the table that shows quantity supplied of gasoline at each price. As price rises, quantity supplied also increases, and vice versa. The supply curve (S) is created by graphing the points from the supply schedule and then connecting them. The upward slope of the supply curve illustrates the law of supply—that a higher price leads to a higher quantity supplied, and vice versa.

Price (per gallon)	Quantity Supplied (millions of gallons)
$1.00	500
$1.20	550
$1.40	600
$1.60	640
$1.80	680
$2.00	700
$2.20	720

Price and Supply of Gasoline

The shape of supply curves will vary somewhat according to the product: steeper, flatter, straighter, or curved. Nearly all supply curves, however, share a basic similarity: they slope up from left to right and illustrate the law of supply: as the price rises, say, from $1.00 per gallon to $2.20 per gallon, the quantity supplied increases from 500 gallons to 720 gallons. Conversely, as the price falls, the quantity supplied decreases.

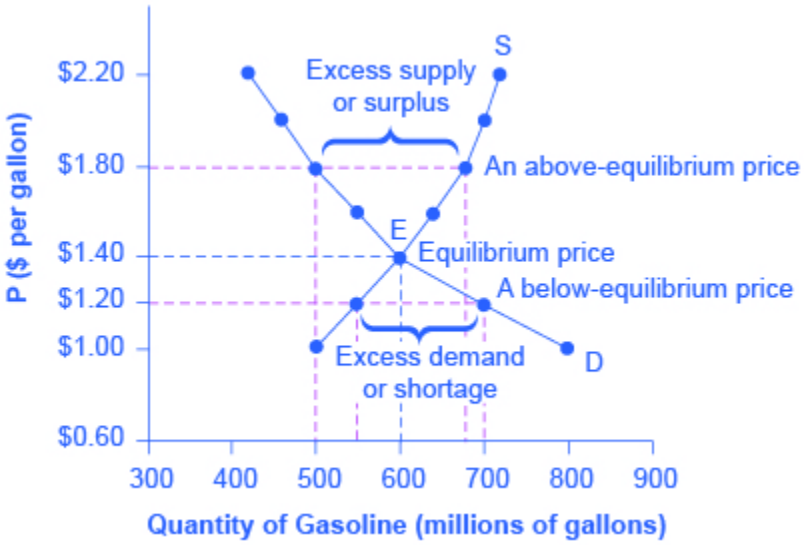
Equilibrium—Where Demand and Supply Intersect

Because the graphs for demand and supply curves both have price on the vertical axis and quantity on the horizontal axis, the demand curve and supply curve for a particular good or service can appear on the same graph.

Together, demand and supply determine the price and the quantity that will be bought and sold in a market.

[link] illustrates the interaction of demand and supply in the market for gasoline. The demand curve (D) is identical to [link]. The supply curve (S) is identical to [link]. [link] contains the same information in tabular form.

Demand and Supply for Gasoline



The demand curve (D) and the supply curve (S) intersect at the equilibrium point E, with a price of $1.40 and a quantity of 600. The equilibrium is the only price where quantity demanded is equal to quantity supplied. At a price above equilibrium like $1.80, quantity supplied exceeds the quantity demanded, so there is excess supply. At a price below equilibrium such as $1.20, quantity demanded exceeds quantity supplied, so there is excess demand.

Price (per gallon)	Quantity demanded (millions of gallons)	Quantity supplied (millions of gallons)
$1.00	800	500
$1.20	700	550
$1.40	**600**	**600**
$1.60	550	640
$1.80	500	680
$2.00	460	700
$2.20	420	720

Price, Quantity Demanded, and Quantity Supplied

Remember this: When two lines on a diagram cross, this intersection usually means something. The point where the supply curve (S) and the demand curve (D) cross, designated by point E in [link], is called the **equilibrium**. The **equilibrium price** is the only price where the plans of consumers and the plans of producers agree—that is, where the amount of the product consumers want to buy (quantity demanded) is equal to the amount producers want to sell (quantity supplied). This common quantity is called the **equilibrium quantity**. At any other price, the quantity demanded does not equal the quantity supplied, so the market is not in equilibrium at that price.

In [link], the equilibrium price is $1.40 per gallon of gasoline and the equilibrium quantity is 600 million gallons. If you had only the demand and supply schedules, and not the graph, you could find the equilibrium by looking for the price level on the tables where the quantity demanded and the quantity supplied are equal.

The word “equilibrium” means “balance.” If a market is at its equilibrium price and quantity, then it has no reason to move away from that point. However, if a market is not at equilibrium, then economic pressures arise to move the market toward the equilibrium price and the equilibrium quantity.

Imagine, for example, that the price of a gallon of gasoline was above the equilibrium price—that is, instead of $1.40 per gallon, the price is $1.80 per gallon. This above-equilibrium price is illustrated by the dashed horizontal line at the price of $1.80 in [link]. At this higher price, the quantity demanded drops from 600 to 500. This decline in quantity reflects how consumers react to the higher price by finding ways to use less gasoline.

Moreover, at this higher price of $1.80, the quantity of gasoline supplied rises from the 600 to 680, as the higher price makes it more profitable for gasoline producers to expand their output. Now, consider how quantity demanded and quantity supplied are related at this above-equilibrium price. Quantity demanded has fallen to 500 gallons, while quantity supplied has risen to 680 gallons. In fact, at any above-equilibrium price, the quantity supplied exceeds the quantity demanded. We call this an **excess supply** or a **surplus**.

With a surplus, gasoline accumulates at gas stations, in tanker trucks, in pipelines, and at oil refineries. This accumulation puts pressure on gasoline sellers. If a surplus remains unsold, those firms involved in making and selling gasoline are not receiving enough cash to pay their workers and to cover their expenses. In this situation, some producers and sellers will want to cut prices, because it is better to sell at a lower price than not to sell at all. Once some sellers start cutting prices, others will follow to avoid losing sales. These price reductions in turn will stimulate a higher quantity demanded. So, if the price is above the equilibrium level, incentives built into the structure of demand and supply will create pressures for the price to fall toward the equilibrium.

Now suppose that the price is below its equilibrium level at $1.20 per gallon, as the dashed horizontal line at this price in [link] shows. At this lower price, the quantity demanded increases from 600 to 700 as drivers take longer trips, spend more minutes warming up the car in the driveway in wintertime, stop sharing rides to work, and buy larger cars that get fewer

miles to the gallon. However, the below-equilibrium price reduces gasoline producers' incentives to produce and sell gasoline, and the quantity supplied falls from 600 to 550.

When the price is below equilibrium, there is **excess demand**, or a **shortage**—that is, at the given price the quantity demanded, which has been stimulated by the lower price, now exceeds the quantity supplied, which had been depressed by the lower price. In this situation, eager gasoline buyers mob the gas stations, only to find many stations running short of fuel. Oil companies and gas stations recognize that they have an opportunity to make higher profits by selling what gasoline they have at a higher price. As a result, the price rises toward the equilibrium level. Read Demand, Supply, and Efficiency for more discussion on the importance of the demand and supply model.

Key Concepts and Summary

A demand schedule is a table that shows the quantity demanded at different prices in the market. A demand curve shows the relationship between quantity demanded and price in a given market on a graph. The law of demand states that a higher price typically leads to a lower quantity demanded.

A supply schedule is a table that shows the quantity supplied at different prices in the market. A supply curve shows the relationship between quantity supplied and price on a graph. The law of supply says that a higher price typically leads to a higher quantity supplied.

The equilibrium price and equilibrium quantity occur where the supply and demand curves cross. The equilibrium occurs where the quantity demanded is equal to the quantity supplied. If the price is below the equilibrium level, then the quantity demanded will exceed the quantity supplied. Excess demand or a shortage will exist. If the price is above the equilibrium level, then the quantity supplied will exceed the quantity demanded. Excess supply or a surplus will exist. In either case, economic pressures will push the price toward the equilibrium level.

Self-Check Question

Exercise:

Problem:

Review [link]. Suppose the price of gasoline is $1.60 per gallon. Is the quantity demanded higher or lower than at the equilibrium price of $1.40 per gallon? And what about the quantity supplied? Is there a shortage or a surplus in the market? If so, of how much?

Solution:

Since $1.60 per gallon is above the equilibrium price, the quantity demanded would be lower at 550 gallons and the quantity supplied would be higher at 640 gallons. (These results are due to the laws of demand and supply, respectively.) The outcome of lower Qd and higher Qs would be a surplus in the gasoline market of 640 – 550 = 90 gallons.

Review Questions

Exercise:

Problem: What determines the level of prices in a market?

Exercise:

Problem:

What does a downward-sloping demand curve mean about how buyers in a market will react to a higher price?

Exercise:

Problem:

Will demand curves have the same exact shape in all markets? If not, how will they differ?

Exercise:

Problem:

Will supply curves have the same shape in all markets? If not, how will they differ?

Exercise:

Problem:

What is the relationship between quantity demanded and quantity supplied at equilibrium? What is the relationship when there is a shortage? What is the relationship when there is a surplus?

Exercise:

Problem:

How can you locate the equilibrium point on a demand and supply graph?

Exercise:

Problem:

If the price is above the equilibrium level, would you predict a surplus or a shortage? If the price is below the equilibrium level, would you predict a surplus or a shortage? Why?

Exercise:

Problem:

When the price is above the equilibrium, explain how market forces move the market price to equilibrium. Do the same when the price is below the equilibrium.

Exercise:

Problem:

What is the difference between the demand and the quantity demanded of a product, say milk? Explain in words and show the difference on a graph with a demand curve for milk.

Exercise:

Problem:

What is the difference between the supply and the quantity supplied of a product, say milk? Explain in words and show the difference on a graph with the supply curve for milk.

Critical Thinking Questions

Exercise:

Problem:

Review [link]. Suppose the government decided that, since gasoline is a necessity, its price should be legally capped at $1.30 per gallon. What do you anticipate would be the outcome in the gasoline market?

Exercise:

Problem:

Explain why the following statement is false: “In the goods market, no buyer would be willing to pay more than the equilibrium price.”

Exercise:

Problem:

Explain why the following statement is false: “In the goods market, no seller would be willing to sell for less than the equilibrium price.”

Problems

Exercise:

Problem:

Review [link] again. Suppose the price of gasoline is $1.00. Will the quantity demanded be lower or higher than at the equilibrium price of $1.40 per gallon? Will the quantity supplied be lower or higher? Is there a shortage or a surplus in the market? If so, of how much?

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Glossary

demand curve
: a graphic representation of the relationship between price and quantity demanded of a certain good or service, with quantity on the horizontal axis and the price on the vertical axis

demand schedule
: a table that shows a range of prices for a certain good or service and the quantity demanded at each price

demand
: the relationship between price and the quantity demanded of a certain good or service

equilibrium price
: the price where quantity demanded is equal to quantity supplied

equilibrium quantity
: the quantity at which quantity demanded and quantity supplied are equal for a certain price level

equilibrium
: the situation where quantity demanded is equal to the quantity supplied; the combination of price and quantity where there is no economic pressure from surpluses or shortages that would cause price or quantity to change

excess demand
: at the existing price, the quantity demanded exceeds the quantity supplied; also called a shortage

excess supply
: at the existing price, quantity supplied exceeds the quantity demanded; also called a surplus

law of demand
: the common relationship that a higher price leads to a lower quantity demanded of a certain good or service and a lower price leads to a higher quantity demanded, while all other variables are held constant

law of supply
: the common relationship that a higher price leads to a greater quantity supplied and a lower price leads to a lower quantity supplied, while all other variables are held constant

price
: what a buyer pays for a unit of the specific good or service

quantity demanded
: the total number of units of a good or service consumers are willing to purchase at a given price

quantity supplied
: the total number of units of a good or service producers are willing to sell at a given price

shortage
: at the existing price, the quantity demanded exceeds the quantity supplied; also called excess demand

supply curve
: a line that shows the relationship between price and quantity supplied on a graph, with quantity supplied on the horizontal axis and price on the vertical axis

supply schedule
: a table that shows a range of prices for a good or service and the quantity supplied at each price

supply
: the relationship between price and the quantity supplied of a certain good or service

surplus
: at the existing price, quantity supplied exceeds the quantity demanded; also called excess supply

Shifts in Demand and Supply for Goods and Services

By the end of this section, you will be able to:

- Identify factors that affect demand
- Graph demand curves and demand shifts
- Identify factors that affect supply
- Graph supply curves and supply shifts

The previous module explored how price affects the quantity demanded and the quantity supplied. The result was the demand curve and the supply curve. Price, however, is not the only thing that influences demand. Nor is it the only thing that influences supply. For example, how is demand for vegetarian food affected if, say, health concerns cause more consumers to avoid eating meat? Or how is the supply of diamonds affected if diamond producers discover several new diamond mines? What are the major factors, in addition to the price, that influence demand or supply?

Note:
Visit this website to read a brief note on how marketing strategies can influence supply and demand of products.



What Factors Affect Demand?

We defined demand as the amount of some product a consumer is willing and able to purchase at each price. That suggests at least two factors in addition to price that affect demand. Willingness to purchase suggests a

desire, based on what economists call tastes and preferences. If you neither need nor want something, you will not buy it. Ability to purchase suggests that income is important. Professors are usually able to afford better housing and transportation than students, because they have more income. Prices of related goods can affect demand also. If you need a new car, the price of a Honda may affect your demand for a Ford. Finally, the size or composition of the population can affect demand. The more children a family has, the greater their demand for clothing. The more driving-age children a family has, the greater their demand for car insurance, and the less for diapers and baby formula.

These factors matter both for demand by an individual and demand by the market as a whole. Exactly how do these various factors affect demand, and how do we show the effects graphically? To answer those questions, we need the *ceteris paribus* assumption.

The *Ceteris Paribus* Assumption

A demand curve or a supply curve is a relationship between two, and only two, variables: quantity on the horizontal axis and price on the vertical axis. The assumption behind a demand curve or a supply curve is that no relevant economic factors, other than the product's price, are changing. Economists call this assumption **ceteris paribus**, a Latin phrase meaning "other things being equal." Any given demand or supply curve is based on the *ceteris paribus* assumption that all else is held equal. A demand curve or a supply curve is a relationship between two, and only two, variables when all other variables are kept constant. If all else is not held equal, then the laws of supply and demand will not necessarily hold, as the following Clear It Up feature shows.

Note:
When does *ceteris paribus* apply?
Ceteris paribus is typically applied when we look at how changes in price affect demand or supply, but *ceteris paribus* can be applied more generally. In the real world, demand and supply depend on more factors than just

price. For example, a consumer's demand depends on income and a producer's supply depends on the cost of producing the product. How can we analyze the effect on demand or supply if multiple factors are changing at the same time—say price rises and income falls? The answer is that we examine the changes one at a time, assuming the other factors are held constant.

For example, we can say that an increase in the price reduces the amount consumers will buy (assuming income, and anything else that affects demand, is unchanged). Additionally, a decrease in income reduces the amount consumers can afford to buy (assuming price, and anything else that affects demand, is unchanged). This is what the *ceteris paribus* assumption really means. In this particular case, after we analyze each factor separately, we can combine the results. The amount consumers buy falls for two reasons: first because of the higher price and second because of the lower income.

How Does Income Affect Demand?

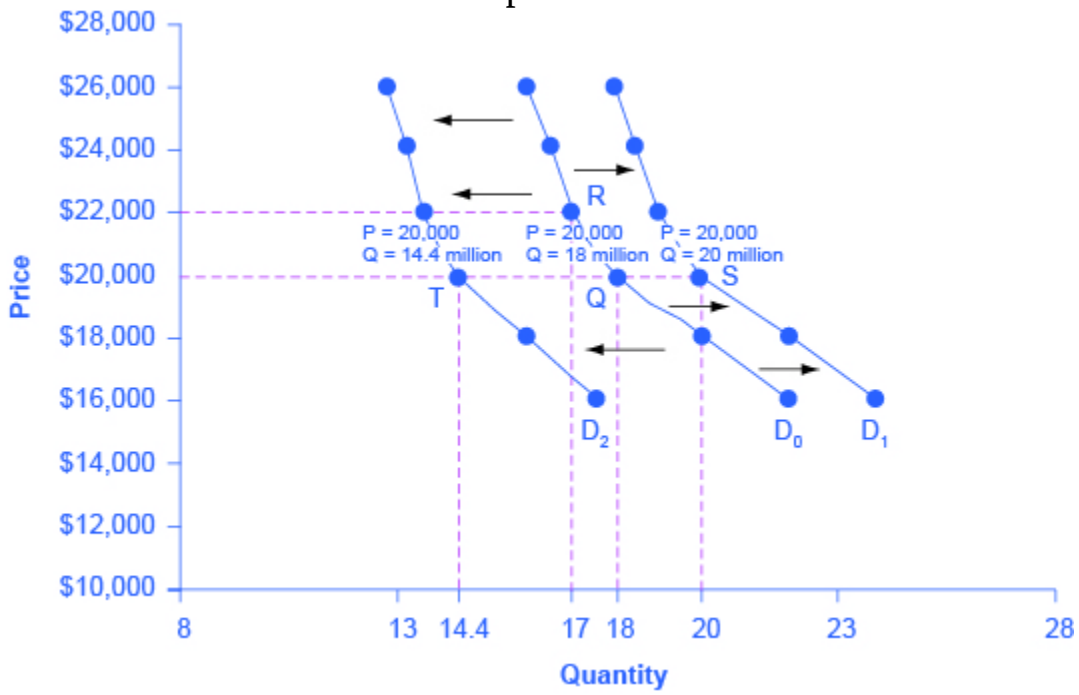
Let's use income as an example of how factors other than price affect demand. [link] shows the initial demand for automobiles as D_0. At point Q, for example, if the price is $20,000 per car, the quantity of cars demanded is 18 million. D_0 also shows how the quantity of cars demanded would change as a result of a higher or lower price. For example, if the price of a car rose to $22,000, the quantity demanded would decrease to 17 million, at point R.

The original demand curve D_0, like every demand curve, is based on the *ceteris paribus* assumption that no other economically relevant factors change. Now imagine that the economy expands in a way that raises the incomes of many people, making cars more affordable. How will this affect demand? How can we show this graphically?

Return to [link]. The price of cars is still $20,000, but with higher incomes, the quantity demanded has now increased to 20 million cars, shown at point S. As a result of the higher income levels, the demand curve shifts to the right to the new demand curve D_1, indicating an increase in demand. [link]

shows clearly that this increased demand would occur at every price, not just the original one.

Shifts in Demand: A Car Example



Increased demand means that at every given price, the quantity demanded is higher, so that the demand curve shifts to the right from D_0 to D_1. Decreased demand means that at every given price, the quantity demanded is lower, so that the demand curve shifts to the left from D_0 to D_2.

Price	**Decrease to D_2**	**Original Quantity Demanded D_0**	**Increase to D_1**
$16,000	17.6 million	22.0 million	24.0 million

Price	Decrease to D_2	Original Quantity Demanded D_0	Increase to D_1
$18,000	16.0 million	20.0 million	22.0 million
$20,000	14.4 million	18.0 million	20.0 million
$22,000	13.6 million	17.0 million	19.0 million
$24,000	13.2 million	16.5 million	18.5 million
$26,000	12.8 million	16.0 million	18.0 million

Price and Demand Shifts: A Car Example

Now, imagine that the economy slows down so that many people lose their jobs or work fewer hours, reducing their incomes. In this case, the decrease in income would lead to a lower quantity of cars demanded at every given price, and the original demand curve D_0 would shift left to D_2. The shift from D_0 to D_2 represents such a decrease in demand: At any given price level, the quantity demanded is now lower. In this example, a price of $20,000 means 18 million cars sold along the original demand curve, but only 14.4 million sold after demand fell.

When a demand curve shifts, it does not mean that the quantity demanded by every individual buyer changes by the same amount. In this example, not everyone would have higher or lower income and not everyone would buy or not buy an additional car. Instead, a shift in a demand curve captures an pattern for the market as a whole.

In the previous section, we argued that higher income causes greater demand at every price. This is true for most goods and services. For some—

luxury cars, vacations in Europe, and fine jewelry—the effect of a rise in income can be especially pronounced. A product whose demand rises when income rises, and vice versa, is called a **normal good**. A few exceptions to this pattern do exist. As incomes rise, many people will buy fewer generic brand groceries and more name brand groceries. They are less likely to buy used cars and more likely to buy new cars. They will be less likely to rent an apartment and more likely to own a home, and so on. A product whose demand falls when income rises, and vice versa, is called an **inferior good**. In other words, when income increases, the demand curve shifts to the left.

Other Factors That Shift Demand Curves

Income is not the only factor that causes a shift in demand. Other things that change demand include tastes and preferences, the composition or size of the population, the prices of related goods, and even expectations. A change in any one of the underlying factors that determine what quantity people are willing to buy at a given price will cause a shift in demand. Graphically, the new demand curve lies either to the right (an increase) or to the left (a decrease) of the original demand curve. Let’s look at these factors.

Changing Tastes or Preferences

From 1980 to 2014, the per-person consumption of chicken by Americans rose from 48 pounds per year to 85 pounds per year, and consumption of beef fell from 77 pounds per year to 54 pounds per year, according to the U.S. Department of Agriculture (USDA). Changes like these are largely due to movements in taste, which change the quantity of a good demanded at every price: that is, they shift the demand curve for that good, rightward for chicken and leftward for beef.

Changes in the Composition of the Population

The proportion of elderly citizens in the United States population is rising. It rose from 9.8% in 1970 to 12.6% in 2000, and will be a projected (by the U.S. Census Bureau) 20% of the population by 2030. A society with relatively more children, like the United States in the 1960s, will have greater demand for goods and services like tricycles and day care facilities.

A society with relatively more elderly persons, as the United States is projected to have by 2030, has a higher demand for nursing homes and hearing aids. Similarly, changes in the size of the population can affect the demand for housing and many other goods. Each of these changes in demand will be shown as a shift in the demand curve.

The demand for a product can also be affected by changes in the prices of related goods such as substitutes or complements. A **substitute** is a good or service that can be used in place of another good or service. As electronic books, like this one, become more available, you would expect to see a decrease in demand for traditional printed books. A lower price for a substitute decreases demand for the other product. For example, in recent years as the price of tablet computers has fallen, the quantity demanded has increased (because of the law of demand). Since people are purchasing tablets, there has been a decrease in demand for laptops, which can be shown graphically as a leftward shift in the demand curve for laptops. A higher price for a substitute good has the reverse effect.

Other goods are **complements** for each other, meaning that the goods are often used together, because consumption of one good tends to enhance consumption of the other. Examples include breakfast cereal and milk; notebooks and pens or pencils, golf balls and golf clubs; gasoline and sport utility vehicles; and the five-way combination of bacon, lettuce, tomato, mayonnaise, and bread. If the price of golf clubs rises, since the quantity demanded of golf clubs falls (because of the law of demand), demand for a complement good like golf balls decreases, too. Similarly, a higher price for skis would shift the demand curve for a complement good like ski resort trips to the left, while a lower price for a complement has the reverse effect.

Changes in Expectations about Future Prices or Other Factors that Affect Demand

While it is clear that the price of a good affects the quantity demanded, it is also true that expectations about the future price (or expectations about tastes and preferences, income, and so on) can affect demand. For example, if people hear that a hurricane is coming, they may rush to the store to buy flashlight batteries and bottled water. If people learn that the price of a good like coffee is likely to rise in the future, they may head for the store to stock

up on coffee now. These changes in demand are shown as shifts in the curve. Therefore, a **shift in demand** happens when a change in some economic factor (other than price) causes a different quantity to be demanded at every price. The following Work It Out feature shows how this happens.

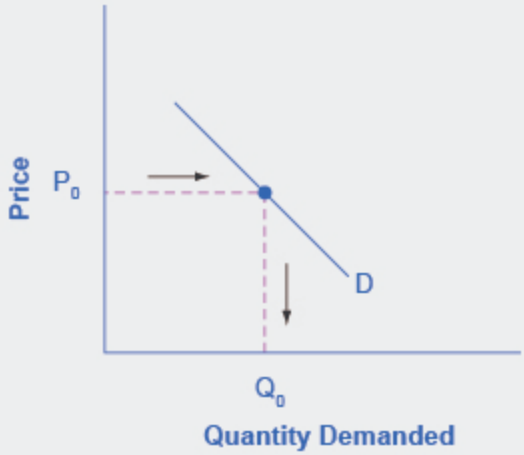
Note:

Shift in Demand

A shift in demand means that at any price (and at every price), the quantity demanded will be different than it was before. Following is an example of a shift in demand due to an income increase.

Step 1. Draw the graph of a demand curve for a normal good like pizza. Pick a price (like P_0). Identify the corresponding Q_0. An example is shown in [link].

Demand Curve

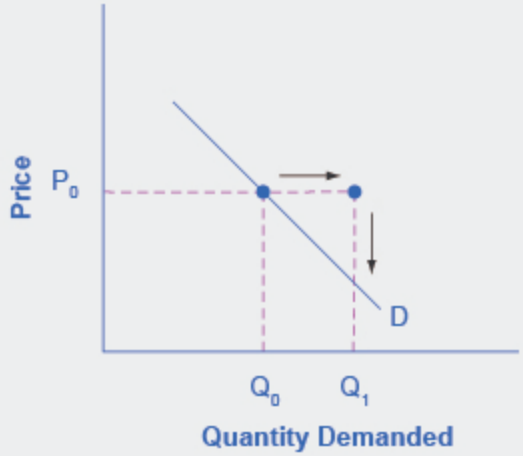


The demand curve can be used to identify how much consumers would buy at any given price.

Step 2. Suppose income increases. As a result of the change, are consumers going to buy more or less pizza? The answer is more. Draw a dotted horizontal line from the chosen price, through the original quantity demanded, to the new point with the new Q_1. Draw a dotted vertical line

down to the horizontal axis and label the new Q_1. An example is provided in [link].

Demand Curve with Income Increase



With an increase in income, consumers will purchase larger quantities, pushing demand to the right.

Step 3. Now, shift the curve through the new point. You will see that an increase in income causes an upward (or rightward) shift in the demand curve, so that at any price the quantities demanded will be higher, as shown in [link].

Demand Curve Shifted Right



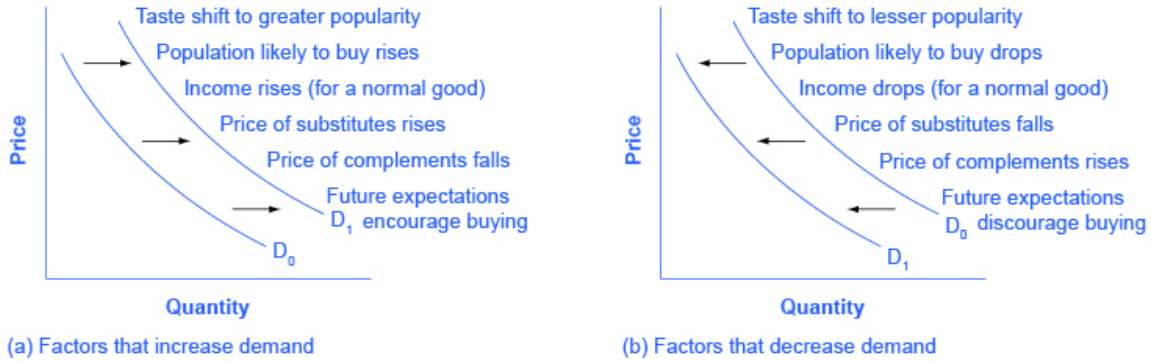
With an increase in income, consumers will

purchase larger quantities, pushing demand to the right, and causing the demand curve to shift right.

Summing Up Factors That Change Demand

Six factors that can shift demand curves are summarized in [link]. The direction of the arrows indicates whether the demand curve shifts represent an increase in demand or a decrease in demand. Notice that a change in the price of the good or service itself is not listed among the factors that can shift a demand curve. A change in the price of a good or service causes a movement along a specific demand curve, and it typically leads to some change in the quantity demanded, but it does not shift the demand curve.

Factors That Shift Demand Curves



(a) A list of factors that can cause an increase in demand from D_0 to D_1. (b) The same factors, if their direction is reversed, can cause a decrease in demand from D_0 to D_1.

When a demand curve shifts, it will then intersect with a given supply curve at a different equilibrium price and quantity. We are, however, getting ahead of our story. Before discussing how changes in demand can affect

equilibrium price and quantity, we first need to discuss shifts in supply curves.

How Production Costs Affect Supply

A supply curve shows how quantity supplied will change as the price rises and falls, assuming *ceteris paribus* so that no other economically relevant factors are changing. If other factors relevant to supply do change, then the entire supply curve will shift. Just as a shift in demand is represented by a change in the quantity demanded at every price, a **shift in supply** means a change in the quantity supplied at every price.

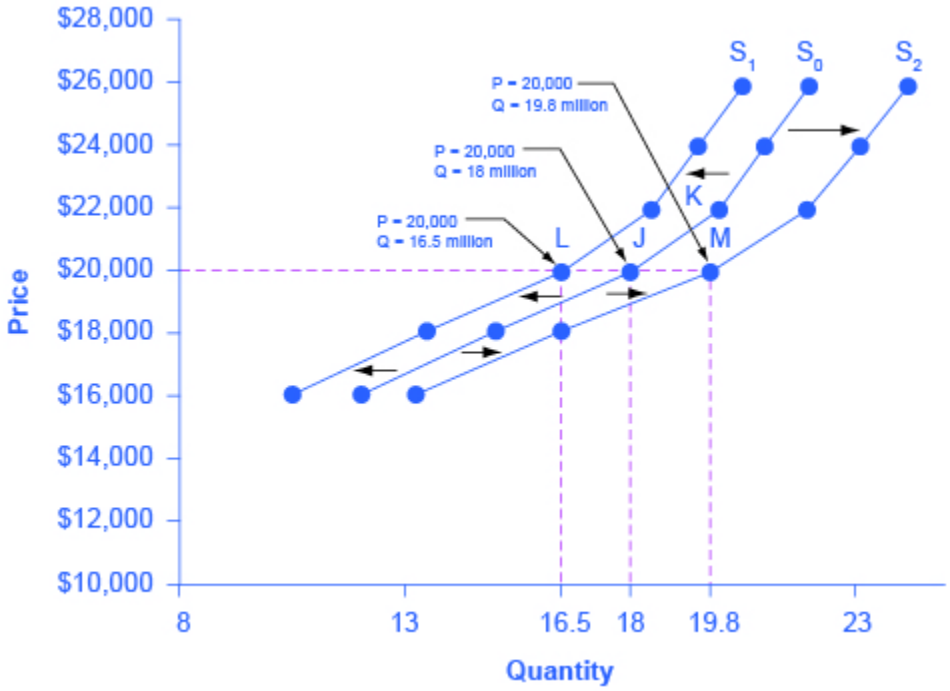
In thinking about the factors that affect supply, remember what motivates firms: profits, which are the difference between revenues and costs. Goods and services are produced using combinations of labor, materials, and machinery, or what we call **inputs** or **factors of production**. If a firm faces lower costs of production, while the prices for the good or service the firm produces remain unchanged, a firm's profits go up. When a firm's profits increase, it is more motivated to produce output, since the more it produces the more profit it will earn. So, when costs of production fall, a firm will tend to supply a larger quantity at any given price for its output. This can be shown by the supply curve shifting to the right.

Take, for example, a messenger company that delivers packages around a city. The company may find that buying gasoline is one of its main costs. If the price of gasoline falls, then the company will find it can deliver messages more cheaply than before. Since lower costs correspond to higher profits, the messenger company may now supply more of its services at any given price. For example, given the lower gasoline prices, the company can now serve a greater area, and increase its supply.

Conversely, if a firm faces higher costs of production, then it will earn lower profits at any given selling price for its products. As a result, a higher cost of production typically causes a firm to supply a smaller quantity at any given price. In this case, the supply curve shifts to the left.

Consider the supply for cars, shown by curve S_0 in [link]. Point J indicates that if the price is $20,000, the quantity supplied will be 18 million cars. If the price rises to $22,000 per car, *ceteris paribus*, the quantity supplied will rise to 20 million cars, as point K on the S_0 curve shows. The same information can be shown in table form, as in [link].

Shifts in Supply: A Car Example



Decreased supply means that at every given price, the quantity supplied is lower, so that the supply curve shifts to the left, from S_0 to S_1. Increased supply means that at every given price, the quantity supplied is higher, so that the supply curve shifts to the right, from S_0 to S_2.

Price	Decrease to S_1	Original Quantity Supplied S_0	Increase to S_2
$16,000	10.5 million	12.0 million	13.2 million
$18,000	13.5 million	15.0 million	16.5 million
$20,000	16.5 million	18.0 million	19.8 million
$22,000	18.5 million	20.0 million	22.0 million
$24,000	19.5 million	21.0 million	23.1 million
$26,000	20.5 million	22.0 million	24.2 million

Price and Shifts in Supply: A Car Example

Now, imagine that the price of steel, an important ingredient in manufacturing cars, rises, so that producing a car has become more expensive. At any given price for selling cars, car manufacturers will react by supplying a lower quantity. This can be shown graphically as a leftward shift of supply, from S_0 to S_1, which indicates that at any given price, the quantity supplied decreases. In this example, at a price of $20,000, the quantity supplied decreases from 18 million on the original supply curve (S_0) to 16.5 million on the supply curve S_1, which is labeled as point L.

Conversely, if the price of steel decreases, producing a car becomes less expensive. At any given price for selling cars, car manufacturers can now expect to earn higher profits, so they will supply a higher quantity. The shift of supply to the right, from S_0 to S_2, means that at all prices, the quantity supplied has increased. In this example, at a price of $20,000, the quantity

supplied increases from 18 million on the original supply curve (S_0) to 19.8 million on the supply curve S_2, which is labeled M.

Other Factors That Affect Supply

In the example above, we saw that changes in the prices of inputs in the production process will affect the cost of production and thus the supply. Several other things affect the cost of production, too, such as changes in weather or other natural conditions, new technologies for production, and some government policies.

The cost of production for many agricultural products will be affected by changes in natural conditions. For example, in 2014 the Manchurian Plain in Northeastern China, which produces most of the country's wheat, corn, and soybeans, experienced its most severe drought in 50 years. A drought decreases the supply of agricultural products, which means that at any given price, a lower quantity will be supplied; conversely, especially good weather would shift the supply curve to the right.

When a firm discovers a new technology that allows the firm to produce at a lower cost, the supply curve will shift to the right, as well. For instance, in the 1960s a major scientific effort nicknamed the Green Revolution focused on breeding improved seeds for basic crops like wheat and rice. By the early 1990s, more than two-thirds of the wheat and rice in low-income countries around the world was grown with these Green Revolution seeds—and the harvest was twice as high per acre. A technological improvement that reduces costs of production will shift supply to the right, so that a greater quantity will be produced at any given price.

Government policies can affect the cost of production and the supply curve through taxes, regulations, and subsidies. For example, the U.S. government imposes a tax on alcoholic beverages that collects about $8 billion per year from producers. Taxes are treated as costs by businesses. Higher costs decrease supply for the reasons discussed above. Other examples of policy that can affect cost are the wide array of government regulations that require firms to spend money to provide a cleaner environment or a safer workplace; complying with regulations increases costs.

A government subsidy, on the other hand, is the opposite of a tax. A subsidy occurs when the government pays a firm directly or reduces the firm's taxes if the firm carries out certain actions. From the firm's perspective, taxes or regulations are an additional cost of production that shifts supply to the left, leading the firm to produce a lower quantity at every given price. Government subsidies reduce the cost of production and increase supply at every given price, shifting supply to the right. The following Work It Out feature shows how this shift happens.

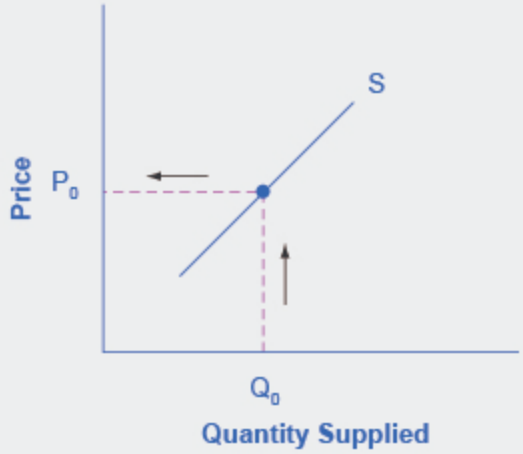
Note:

Shift in Supply

We know that a supply curve shows the minimum price a firm will accept to produce a given quantity of output. What happens to the supply curve when the cost of production goes up? Following is an example of a shift in supply due to a production cost increase.

Step 1. Draw a graph of a supply curve for pizza. Pick a quantity (like Q_0). If you draw a vertical line up from Q_0 to the supply curve, you will see the price the firm chooses. An example is shown in [link].

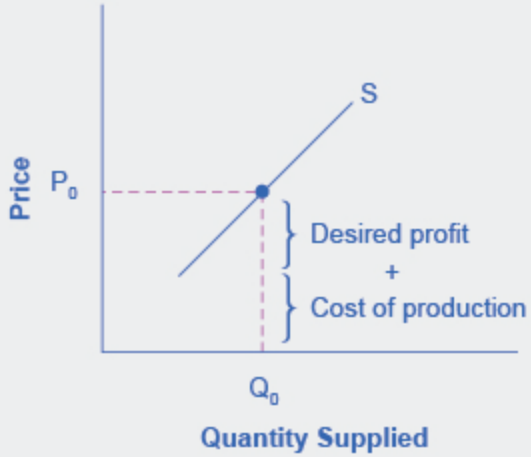
Suppy Curve



The supply curve can be used to show the minimum price a firm will accept to produce a given quantity of output.

Step 2. Why did the firm choose that price and not some other? One way to think about this is that the price is composed of two parts. The first part is the cost of producing pizzas at the margin; in this case, the cost of producing the pizza, including cost of ingredients (dough, sauce, cheese, pepperoni, and so on), the cost of the pizza oven, the rent on the shop, and the wages of the workers. The second part is the firm's desired profit, which is determined, among other factors, by the profit margins in that particular business. If you add these two parts together, you get the price the firm wishes to charge. The quantity Q0 and associated price P0 give you one point on the firm's supply curve, as shown in [link].

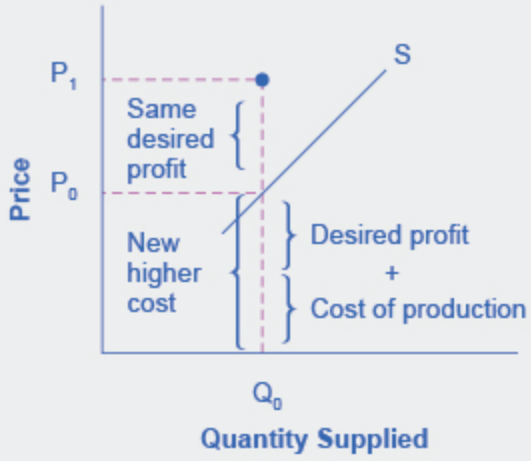
Setting Prices



The cost of production and the desired profit equal the price a firm will set for a product.

Step 3. Now, suppose that the cost of production goes up. Perhaps cheese has become more expensive by $0.75 per pizza. If that is true, the firm will want to raise its price by the amount of the increase in cost ($0.75). Draw this point on the supply curve directly above the initial point on the curve, but $0.75 higher, as shown in [link].

Increasing Costs Leads to Increasing Price



Because the cost of production and the desired profit equal the price a firm will set for a product, if the cost of production increases, the price for the product will also need to increase.

Step 4. Shift the supply curve through this point. You will see that an increase in cost causes an upward (or a leftward) shift of the supply curve so that at any price, the quantities supplied will be smaller, as shown in [link].

Supply Curve Shifts



When the cost of production increases, the supply curve shifts upwardly to a new price

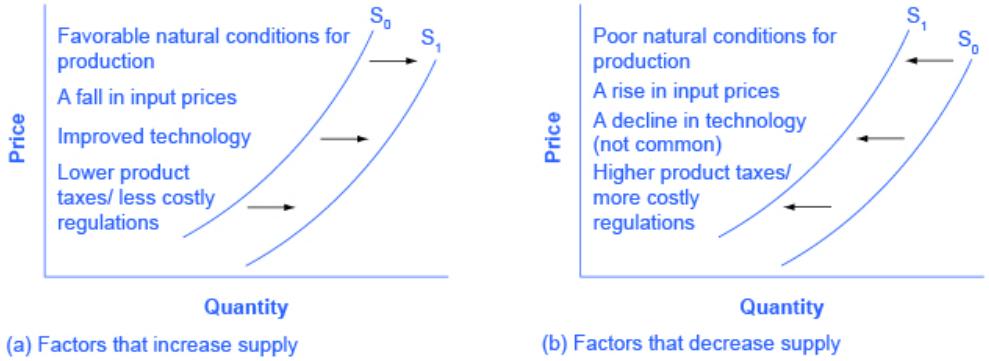
level.

Summing Up Factors That Change Supply

Changes in the cost of inputs, natural disasters, new technologies, and the impact of government decisions all affect the cost of production. In turn, these factors affect how much firms are willing to supply at any given price.

[link] summarizes factors that change the supply of goods and services. Notice that a change in the price of the product itself is not among the factors that shift the supply curve. Although a change in price of a good or service typically causes a change in quantity supplied or a movement along the supply curve for that specific good or service, it does not cause the supply curve itself to shift.

Factors That Shift Supply Curves



(a) A list of factors that can cause an increase in supply from S_0 to S_1. (b) The same factors, if their direction is reversed, can cause a decrease in supply from S_0 to S_1.

Because demand and supply curves appear on a two-dimensional diagram with only price and quantity on the axes, an unwary visitor to the land of economics might be fooled into believing that economics is about only four

topics: demand, supply, price, and quantity. However, demand and supply are really “umbrella” concepts: demand covers all the factors that affect demand, and supply covers all the factors that affect supply. Factors other than price that affect demand and supply are included by using shifts in the demand or the supply curve. In this way, the two-dimensional demand and supply model becomes a powerful tool for analyzing a wide range of economic circumstances.

Key Concepts and Summary

Economists often use the *ceteris paribus* or “other things being equal” assumption: while examining the economic impact of one event, all other factors remain unchanged for the purpose of the analysis. Factors that can shift the demand curve for goods and services, causing a different quantity to be demanded at any given price, include changes in tastes, population, income, prices of substitute or complement goods, and expectations about future conditions and prices. Factors that can shift the supply curve for goods and services, causing a different quantity to be supplied at any given price, include input prices, natural conditions, changes in technology, and government taxes, regulations, or subsidies.

Self-Check Questions

Exercise:

Problem: Why do economists use the *ceteris paribus* assumption?

Solution:

To make it easier to analyze complex problems. *Ceteris paribus* allows you to look at the effect of one factor at a time on what it is you are trying to analyze. When you have analyzed all the factors individually, you add the results together to get the final answer.

Exercise:

Problem:

In an analysis of the market for paint, an economist discovers the facts listed below. State whether each of these changes will affect supply or demand, and in what direction.

a. There have recently been some important cost-saving inventions in the technology for making paint.
b. Paint is lasting longer, so that property owners need not repaint as often.
c. Because of severe hailstorms, many people need to repaint now.
d. The hailstorms damaged several factories that make paint, forcing them to close down for several months.

Solution:

a. An improvement in technology that reduces the cost of production will cause an increase in supply. Alternatively, you can think of this as a reduction in price necessary for firms to supply any quantity. Either way, this can be shown as a rightward (or downward) shift in the supply curve.
b. An improvement in product quality is treated as an increase in tastes or preferences, meaning consumers demand more paint at any price level, so demand increases or shifts to the right. If this seems counterintuitive, note that demand in the future for the longer-lasting paint will fall, since consumers are essentially shifting demand from the future to the present.
c. An increase in need causes an increase in demand or a rightward shift in the demand curve.
d. Factory damage means that firms are unable to supply as much in the present. Technically, this is an increase in the cost of production. Either way you look at it, the supply curve shifts to the left.

Exercise:

Problem:

Many changes are affecting the market for oil. Predict how each of the following events will affect the equilibrium price and quantity in the market for oil. In each case, state how the event will affect the supply and demand diagram. Create a sketch of the diagram if necessary.

a. Cars are becoming more fuel efficient, and therefore get more miles to the gallon.
b. The winter is exceptionally cold.
c. A major discovery of new oil is made off the coast of Norway.
d. The economies of some major oil-using nations, like Japan, slow down.
e. A war in the Middle East disrupts oil-pumping schedules.
f. Landlords install additional insulation in buildings.
g. The price of solar energy falls dramatically.
h. Chemical companies invent a new, popular kind of plastic made from oil.

Solution:

a. More fuel-efficient cars means there is less need for gasoline. This causes a leftward shift in the demand for gasoline and thus oil. Since the demand curve is shifting down the supply curve, the equilibrium price and quantity both fall.
b. Cold weather increases the need for heating oil. This causes a rightward shift in the demand for heating oil and thus oil. Since the demand curve is shifting up the supply curve, the equilibrium price and quantity both rise.
c. A discovery of new oil will make oil more abundant. This can be shown as a rightward shift in the supply curve, which will cause a decrease in the equilibrium price along with an increase in the equilibrium quantity. (The supply curve shifts down the demand curve so price and quantity follow the law of demand. If price goes down, then the quantity goes up.)

d. When an economy slows down, it produces less output and demands less input, including energy, which is used in the production of virtually everything. A decrease in demand for energy will be reflected as a decrease in the demand for oil, or a leftward shift in demand for oil. Since the demand curve is shifting down the supply curve, both the equilibrium price and quantity of oil will fall.
e. Disruption of oil pumping will reduce the supply of oil. This leftward shift in the supply curve will show a movement up the demand curve, resulting in an increase in the equilibrium price of oil and a decrease in the equilibrium quantity.
f. Increased insulation will decrease the demand for heating. This leftward shift in the demand for oil causes a movement down the supply curve, resulting in a decrease in the equilibrium price and quantity of oil.
g. Solar energy is a substitute for oil-based energy. So if solar energy becomes cheaper, the demand for oil will decrease as consumers switch from oil to solar. The decrease in demand for oil will be shown as a leftward shift in the demand curve. As the demand curve shifts down the supply curve, both equilibrium price and quantity for oil will fall.
h. A new, popular kind of plastic will increase the demand for oil. The increase in demand will be shown as a rightward shift in demand, raising the equilibrium price and quantity of oil.

Review Questions

Exercise:

Problem:

When analyzing a market, how do economists deal with the problem that many factors that affect the market are changing at the same time?

Exercise:

Problem:

Name some factors that can cause a shift in the demand curve in markets for goods and services.

Exercise:

Problem:

Name some factors that can cause a shift in the supply curve in markets for goods and services.

Critical Thinking Questions

Exercise:

Problem:

Consider the demand for hamburgers. If the price of a substitute good (for example, hot dogs) increases and the price of a complement good (for example, hamburger buns) increases, can you tell for sure what will happen to the demand for hamburgers? Why or why not? Illustrate your answer with a graph.

Exercise:

Problem:

How do you suppose the demographics of an aging population of “Baby Boomers” in the United States will affect the demand for milk? Justify your answer.

Exercise:

Problem:

We know that a change in the price of a product causes a movement along the demand curve. Suppose consumers believe that prices will be rising in the future. How will that affect demand for the product in the present? Can you show this graphically?

Exercise:

Problem:

Suppose there is soda tax to curb obesity. What should a reduction in the soda tax do to the supply of sodas and to the equilibrium price and quantity? Can you show this graphically? *Hint*: assume that the soda tax is collected from the sellers

Problems

Exercise:

Problem:

[link] shows information on the demand and supply for bicycles, where the quantities of bicycles are measured in thousands.

Price	Qd	Qs
$120	50	36
$150	40	40
$180	32	48
$210	28	56
$240	24	70

a. What is the quantity demanded and the quantity supplied at a price of $210?

b. At what price is the quantity supplied equal to 48,000?
c. Graph the demand and supply curve for bicycles. How can you determine the equilibrium price and quantity from the graph? How can you determine the equilibrium price and quantity from the table? What are the equilibrium price and equilibrium quantity?
d. If the price was $120, what would the quantities demanded and supplied be? Would a shortage or surplus exist? If so, how large would the shortage or surplus be?

Exercise:

Problem:

The computer market in recent years has seen many more computers sell at much lower prices. What shift in demand or supply is most likely to explain this outcome? Sketch a demand and supply diagram and explain your reasoning for each.

a. A rise in demand
b. A fall in demand
c. A rise in supply
d. A fall in supply

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Glossary

ceteris paribus
: other things being equal

complements
: goods that are often used together so that consumption of one good tends to enhance consumption of the other

factors of production
: the combination of labor, materials, and machinery that is used to produce goods and services; also called inputs

inferior good
: a good in which the quantity demanded falls as income rises, and in which quantity demanded rises and income falls

inputs
: the combination of labor, materials, and machinery that is used to produce goods and services; also called factors of production

normal good
: a good in which the quantity demanded rises as income rises, and in which quantity demanded falls as income falls

shift in demand
: when a change in some economic factor (other than price) causes a different quantity to be demanded at every price

shift in supply
: when a change in some economic factor (other than price) causes a different quantity to be supplied at every price

substitute

a good that can replace another to some extent, so that greater consumption of one good can mean less of the other

Changes in Equilibrium Price and Quantity: The Four-Step Process

By the end of this section, you will be able to:

- Identify equilibrium price and quantity through the four-step process
- Graph equilibrium price and quantity
- Contrast shifts of demand or supply and movements along a demand or supply curve
- Graph demand and supply curves, including equilibrium price and quantity, based on real-world examples

Let’s begin this discussion with a single economic event. It might be an event that affects demand, like a change in income, population, tastes, prices of substitutes or complements, or expectations about future prices. It might be an event that affects supply, like a change in natural conditions, input prices, or technology, or government policies that affect production. How does this economic event affect equilibrium price and quantity? We will analyze this question using a four-step process.

Step 1. Draw a demand and supply model before the economic change took place. To establish the model requires four standard pieces of information: The law of demand, which tells us the slope of the demand curve; the law of supply, which gives us the slope of the supply curve; the shift variables for demand; and the shift variables for supply. From this model, find the initial equilibrium values for price and quantity.

Step 2. Decide whether the economic change being analyzed affects demand or supply. In other words, does the event refer to something in the list of demand factors or supply factors?

Step 3. Decide whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram. In other words, does the event increase or decrease the amount consumers want to buy or producers want to sell?

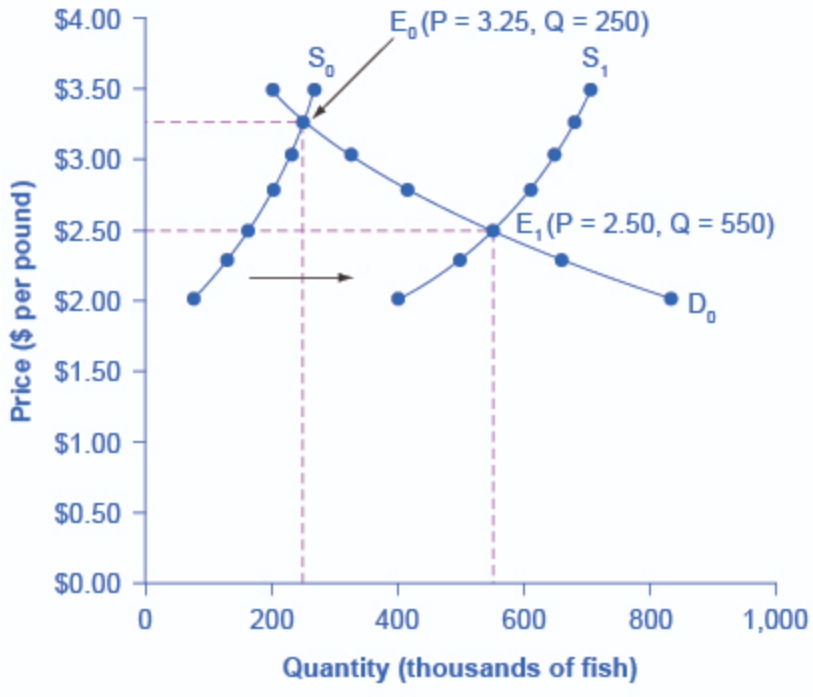
Step 4. Identify the new equilibrium and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

Let’s consider one example that involves a shift in supply and one that involves a shift in demand. Then we will consider an example where both supply and demand shift.

Good Weather for Salmon Fishing

In the summer of 2000, weather conditions were excellent for commercial salmon fishing off the California coast. Heavy rains meant higher than normal levels of water in the rivers, which helps the salmon to breed. Slightly cooler ocean temperatures stimulated the growth of plankton, the microscopic organisms at the bottom of the ocean food chain, providing everything in the ocean with a hearty food supply. The ocean stayed calm during fishing season, so commercial fishing operations did not lose many days to bad weather. How did these climate conditions affect the quantity and price of salmon? [link] illustrates the four-step approach, which is explained below, to work through this problem. [link] provides the information to work the problem as well.

Good Weather for Salmon Fishing: The Four-Step Process



Unusually good weather leads to changes in the price and quantity of salmon.

Price per Pound	Quantity Supplied in 1999	Quantity Supplied in 2000	Quantity Demanded
$2.00	80	400	840
$2.25	120	480	680
$2.50	160	550	550
$2.75	200	600	450
$3.00	230	640	350
$3.25	250	670	250
$3.50	270	700	200

Salmon Fishing

Step 1. Draw a demand and supply model to illustrate the market for salmon in the year before the good weather conditions began. The demand curve D_0 and the supply curve S_0 show that the original equilibrium price is $3.25 per pound and the original equilibrium quantity is 250,000 fish. (This price per pound is what commercial buyers pay at the fishing docks; what consumers pay at the grocery is higher.)

Step 2. Did the economic event affect supply or demand? Good weather is an example of a natural condition that affects supply.

Step 3. Was the effect on supply an increase or a decrease? Good weather is a change in natural conditions that increases the quantity supplied at any given price. The supply curve shifts to the right, moving from the original supply curve S_0 to the new supply curve S_1, which is shown in both the table and the figure.

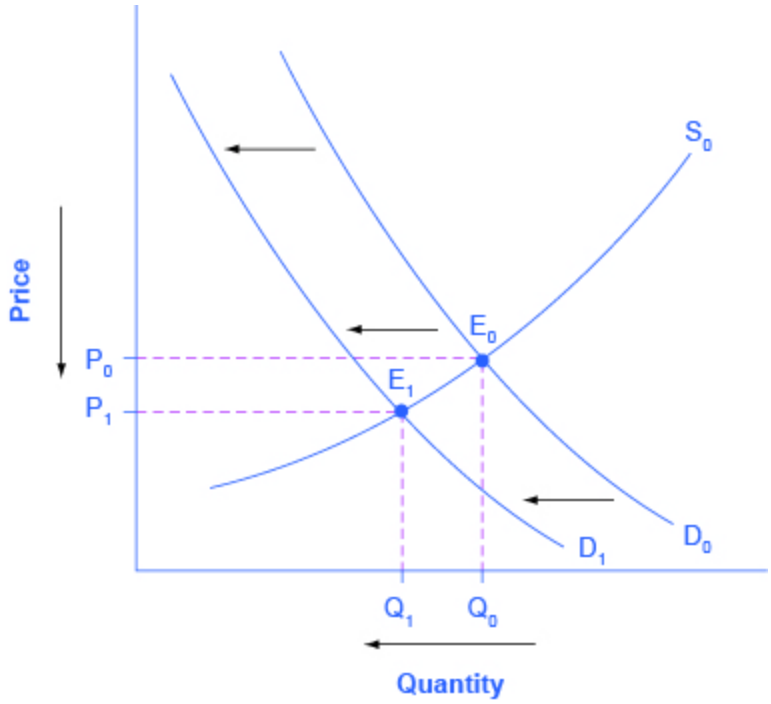
Step 4. Compare the new equilibrium price and quantity to the original equilibrium. At the new equilibrium E_1, the equilibrium price falls from $3.25 to $2.50, but the equilibrium quantity increases from 250,000 to 550,000 salmon. Notice that the equilibrium quantity demanded increased, even though the demand curve did not move.

In short, good weather conditions increased supply of the California commercial salmon. The result was a higher equilibrium quantity of salmon bought and sold in the market at a lower price.

Newspapers and the Internet

According to the Pew Research Center for People and the Press, more and more people, especially younger people, are getting their news from online and digital sources. The majority of U.S. adults now own smartphones or tablets, and most of those Americans say they use them in part to get the news. From 2004 to 2012, the share of Americans who reported getting their news from digital sources increased from 24% to 39%. How has this affected consumption of print news media, and radio and television news? [link] and the text below illustrates using the four-step analysis to answer this question.

The Print News Market: A Four-Step Analysis



A change in tastes from print news sources to digital sources results in a leftward shift in demand for the former. The result is a decrease in both equilibrium price and quantity.

Step 1. Develop a demand and supply model to think about what the market looked like before the event. The demand curve D_0 and the supply curve S_0 show the original relationships. In this case, the analysis is performed without specific numbers on the price and quantity axis.

Step 2. Did the change described affect supply or demand? A change in tastes, from traditional news sources (print, radio, and television) to digital sources, caused a change in demand for the former.

Step 3. Was the effect on demand positive or negative? A shift to digital news sources will tend to mean a lower quantity demanded of traditional news sources at every given price, causing the demand curve for print and other traditional news sources to shift to the left, from D_0 to D_1.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price. The new equilibrium (E_1) occurs at a lower quantity and a lower price than the original equilibrium (E_0).

The decline in print news reading predates 2004. Print newspaper circulation peaked in 1973 and has declined since then due to competition from television and radio news. In 1991, 55% of Americans indicated they got their news from print sources, while only 29% did so in 2012. Radio news has followed a similar path in recent decades, with the share of Americans getting their news from radio declining from 54% in 1991 to 33% in 2012. Television news has held its own over the last 15 years, with a market share staying in the mid to upper fifties. What does this suggest for the future, given that two-thirds of Americans under 30 years old say they do not get their news from television at all?

The Interconnections and Speed of Adjustment in Real Markets

In the real world, many factors that affect demand and supply can change all at once. For example, the demand for cars might increase because of rising incomes and population, and it might decrease because of rising gasoline prices (a complementary good). Likewise, the supply of cars might increase because of innovative new technologies that reduce the cost of car production, and it might decrease as a result of new government regulations requiring the installation of costly pollution-control technology.

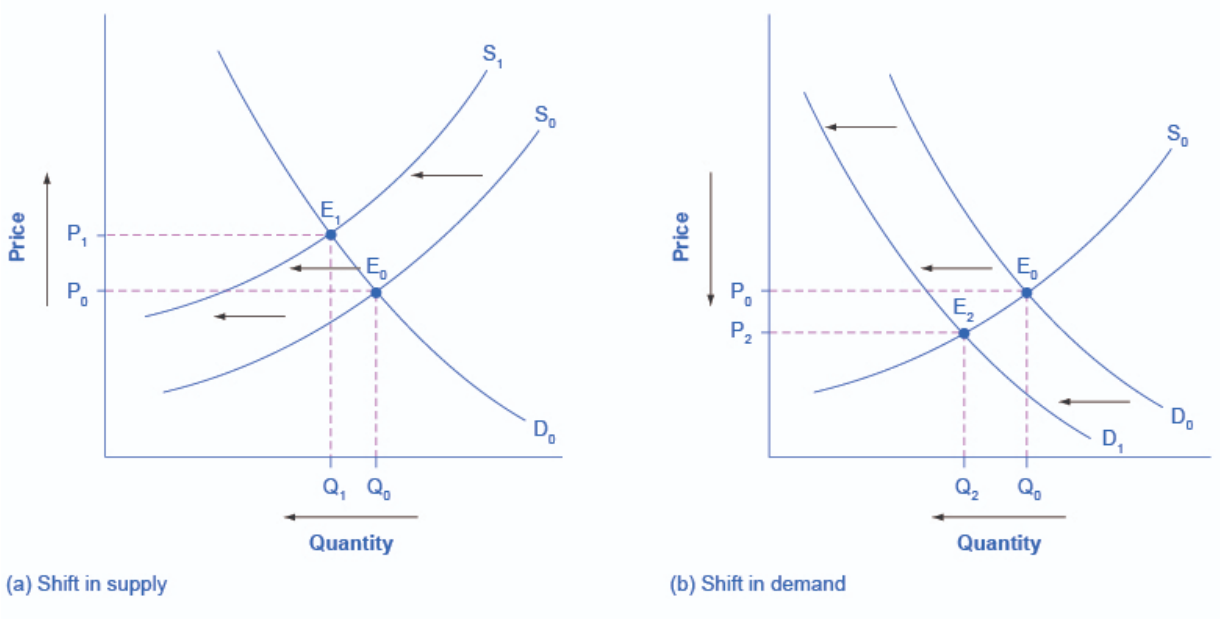
Moreover, rising incomes and population or changes in gasoline prices will affect many markets, not just cars. How can an economist sort out all these interconnected events? The answer lies in the *ceteris paribus* assumption. Look at how each economic event affects each market, one event at a time, holding all else constant. Then combine the analyses to see the net effect.

A Combined Example

The U.S. Postal Service is facing difficult challenges. Compensation for postal workers tends to increase most years due to cost-of-living increases.

At the same time, more and more people are using email, text, and other digital message forms such as Facebook and Twitter to communicate with friends and others. What does this suggest about the continued viability of the Postal Service? [link] and the text below illustrates using the four-step analysis to answer this question.

Higher Compensation for Postal Workers: A Four-Step Analysis



(a) Higher labor compensation causes a leftward shift in the supply curve, a decrease in the equilibrium quantity, and an increase in the equilibrium price. (b) A change in tastes away from Postal Services causes a leftward shift in the demand curve, a decrease in the equilibrium quantity, and a decrease in the equilibrium price.

Since this problem involves two disturbances, we need two four-step analyses, the first to analyze the effects of higher compensation for postal workers, the second to analyze the effects of many people switching from “snailmail” to email and other digital messages.

[link] (a) shows the shift in supply discussed in the following steps.

Step 1. Draw a demand and supply model to illustrate what the market for the U.S. Postal Service looked like before this scenario starts. The demand

curve D_0 and the supply curve S_0 show the original relationships.

Step 2. Did the change described affect supply or demand? Labor compensation is a cost of production. A change in production costs caused a change in supply for the Postal Service.

Step 3. Was the effect on supply positive or negative? Higher labor compensation leads to a lower quantity supplied of postal services at every given price, causing the supply curve for postal services to shift to the left, from S_0 to S_1.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price. The new equilibrium (E_1) occurs at a lower quantity and a higher price than the original equilibrium (E_0).

[link] (b) shows the shift in demand discussed in the following steps.

Step 1. Draw a demand and supply model to illustrate what the market for U.S. Postal Services looked like before this scenario starts. The demand curve D_0 and the supply curve S_0 show the original relationships. Note that this diagram is independent from the diagram in panel (a).

Step 2. Did the change described affect supply or demand? A change in tastes away from snailmail toward digital messages will cause a change in demand for the Postal Service.

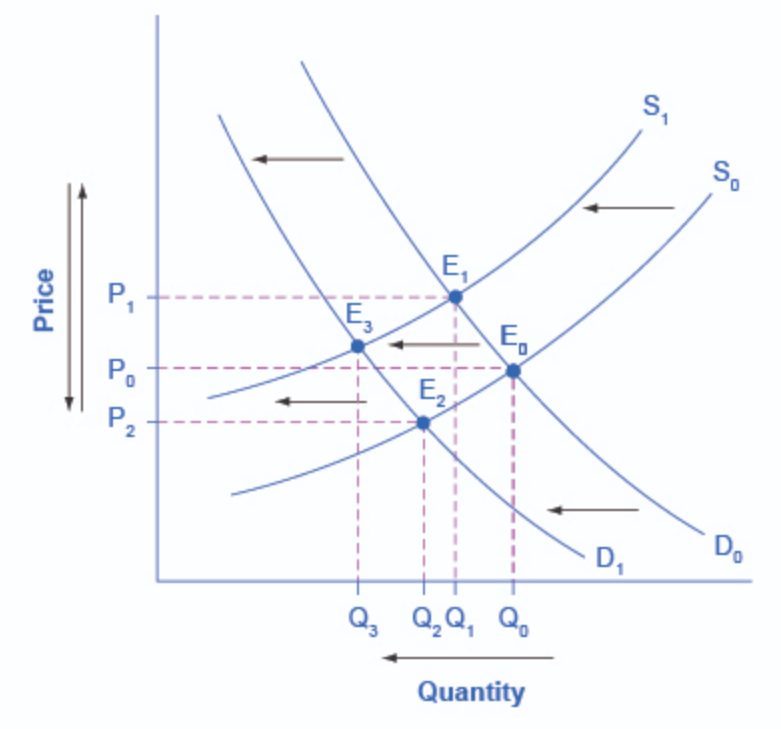
Step 3. Was the effect on demand positive or negative? A change in tastes away from snailmail toward digital messages causes lower quantity demanded of postal services at every given price, causing the demand curve for postal services to shift to the left, from D_0 to D_1.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price. The new equilibrium (E_2) occurs at a lower quantity and a lower price than the original equilibrium (E_0).

The final step in a scenario where both supply and demand shift is to combine the two individual analyses to determine what happens to the

equilibrium quantity and price. Graphically, we superimpose the previous two diagrams one on top of the other, as in [link].

Combined Effect of Decreased Demand and Decreased Supply



Supply and demand shifts cause changes in equilibrium price and quantity.

Following are the results:

Effect on Quantity: The effect of higher labor compensation on Postal Services because it raises the cost of production is to decrease the equilibrium quantity. The effect of a change in tastes away from snailmail is to decrease the equilibrium quantity. Since both shifts are to the left, the overall impact is a decrease in the equilibrium quantity of Postal Services (Q_3). This is easy to see graphically, since Q_3 is to the left of Q_0.

Effect on Price: The overall effect on price is more complicated. The effect of higher labor compensation on Postal Services, because it raises the cost of production, is to increase the equilibrium price. The effect of a change in

tastes away from snailmail is to decrease the equilibrium price. Since the two effects are in opposite directions, unless we know the magnitudes of the two effects, the overall effect is unclear. This is not unusual. When both curves shift, typically we can determine the overall effect on price or on quantity, but not on both. In this case, we determined the overall effect on the equilibrium quantity, but not on the equilibrium price. In other cases, it might be the opposite.

The next Clear It Up feature focuses on the difference between shifts of supply or demand and movements along a curve.

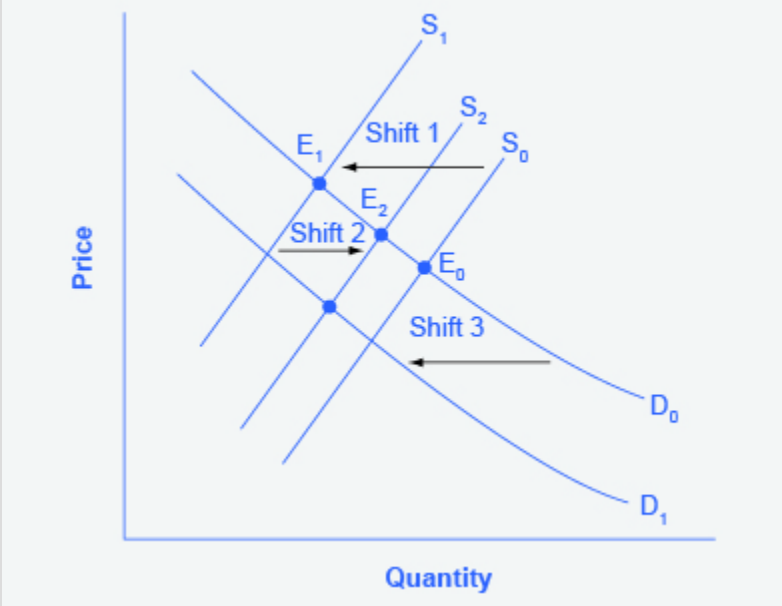
Note:

What is the difference between shifts of demand or supply versus movements along a demand or supply curve?

One common mistake in applying the demand and supply framework is to confuse the shift of a demand or a supply curve with movement along a demand or supply curve. As an example, consider a problem that asks whether a drought will increase or decrease the equilibrium quantity and equilibrium price of wheat. Lee, a student in an introductory economics class, might reason:

"Well, it is clear that a drought reduces supply, so I will shift back the supply curve, as in the shift from the original supply curve S_0 to S_1 shown on the diagram (called Shift 1). So the equilibrium moves from E_0 to E_1, the equilibrium quantity is lower and the equilibrium price is higher. Then, a higher price makes farmers more likely to supply the good, so the supply curve shifts right, as shown by the shift from S_1 to S_2, on the diagram (shown as Shift 2), so that the equilibrium now moves from E_1 to E_2. The higher price, however, also reduces demand and so causes demand to shift back, like the shift from the original demand curve, D_0 to D_1 on the diagram (labeled Shift 3), and the equilibrium moves from E_2 to E_3."

Shifts of Demand or Supply versus Movements along a Demand or Supply Curve



A shift in one curve never causes a shift in the other curve. Rather, a shift in one curve causes a movement along the second curve.

At about this point, Lee suspects that this answer is headed down the wrong path. Think about what might be wrong with Lee's logic, and then read the answer that follows.

Answer: Lee's first step is correct: that is, a drought shifts back the supply curve of wheat and leads to a prediction of a lower equilibrium quantity and a higher equilibrium price. This corresponds to a movement along the original demand curve (D_0), from E_0 to E_1. The rest of Lee's argument is wrong, because it mixes up shifts in supply with quantity supplied, and shifts in demand with quantity demanded. A higher or lower price never shifts the supply curve, as suggested by the shift in supply from S_1 to S_2. Instead, a price change leads to a movement along a given supply curve. Similarly, a higher or lower price never shifts a demand curve, as suggested in the shift from D_0 to D_1. Instead, a price change leads to a movement along a given demand curve. Remember, a change in the price of a good never causes the demand or supply curve for that good to shift. Think carefully about the timeline of events: What happens first, what happens next? What is cause, what is effect? If you keep the order right, you are more likely to get the analysis correct.

In the four-step analysis of how economic events affect equilibrium price and quantity, the movement from the old to the new equilibrium seems immediate. As a practical matter, however, prices and quantities often do not zoom straight to equilibrium. More realistically, when an economic event causes demand or supply to shift, prices and quantities set off in the general direction of equilibrium. Indeed, even as they are moving toward one new equilibrium, prices are often then pushed by another change in demand or supply toward another equilibrium.

Key Concepts and Summary

When using the supply and demand framework to think about how an event will affect the equilibrium price and quantity, proceed through four steps: (1) sketch a supply and demand diagram to think about what the market looked like before the event; (2) decide whether the event will affect supply or demand; (3) decide whether the effect on supply or demand is negative or positive, and draw the appropriate shifted supply or demand curve; (4) compare the new equilibrium price and quantity to the original ones.

Self-Check Questions

Exercise:

Problem:

Let’s think about the market for air travel. From August 2014 to January 2015, the price of jet fuel decreased roughly 47%. Using the four-step analysis, how do you think this fuel price decrease affected the equilibrium price and quantity of air travel?

Solution:

Step 1. Draw the graph with the initial supply and demand curves. Label the initial equilibrium price and quantity.

Step 2. Did the economic event affect supply or demand? Jet fuel is a cost of producing air travel, so an increase in jet fuel price affects

supply.

Step 3. An increase in the price of jet fuel caused a decrease in the cost of air travel. We show this as a downward or rightward shift in supply.

Step 4. A rightward shift in supply causes a movement down the demand curve, lowering the equilibrium price of air travel and increasing the equilibrium quantity.

Exercise:

Problem:

A tariff is a tax on imported goods. Suppose the U.S. government cuts the tariff on imported flat screen televisions. Using the four-step analysis, how do you think the tariff reduction will affect the equilibrium price and quantity of flat screen TVs?

Solution:

Step 1. Draw the graph with the initial supply and demand curves. Label the initial equilibrium price and quantity.

Step 2. Did the economic event affect supply or demand? A tariff is treated like a cost of production, so this affects supply.

Step 3. A tariff reduction is equivalent to a decrease in the cost of production, which we can show as a rightward (or downward) shift in supply.

Step 4. A rightward shift in supply causes a movement down the demand curve, lowering the equilibrium price and raising the equilibrium quantity.

Review Questions

Exercise:

Problem:

How does one analyze a market where both demand and supply shift?

Exercise:

Problem:

What causes a movement along the demand curve? What causes a movement along the supply curve?

Critical Thinking Questions

Exercise:

Problem:

Use the four-step process to analyze the impact of the advent of the iPod (or other portable digital music players) on the equilibrium price and quantity of the Sony Walkman (or other portable audio cassette players).

Exercise:

Problem:

Use the four-step process to analyze the impact of a reduction in tariffs on imports of iPods on the equilibrium price and quantity of Sony Walkman-type products.

Exercise:

Problem:

Suppose both of these events took place at the same time. Combine your analyses of the impacts of the iPod and the tariff reduction to determine the likely impact on the equilibrium price and quantity of Sony Walkman-type products. Show your answer graphically.

Problems

Exercise:

Problem:

Demand and supply in the market for cheddar cheese is illustrated in [link]. Graph the data and find the equilibrium. Next, create a table showing the change in quantity demanded or quantity supplied, and a graph of the new equilibrium, in each of the following situations:

a. The price of milk, a key input for cheese production, rises, so that the supply decreases by 80 pounds at every price.
b. A new study says that eating cheese is good for your health, so that demand increases by 20% at every price.

Price per Pound	**Qd**	**Qs**
$3.00	750	540
$3.20	700	600
$3.40	**650**	**650**
$3.60	620	700
$3.80	600	720
$4.00	590	730

Exercise:

Problem:

Supply and demand for movie tickets in a city are shown in [link]. Graph demand and supply and identify the equilibrium. Then calculate in a table and graph the effect of the following two changes.

a. Three new nightclubs open. They offer decent bands and have no cover charge, but make their money by selling food and drink. As a result, demand for movie tickets falls by six units at every price.
b. The city eliminates a tax that it had been placing on all local entertainment businesses. The result is that the quantity supplied of movies at any given price increases by 10%.

Price per Pound	Qd	Qs
$5.00	26	16
$6.00	24	18
$7.00	22	20
$8.00	21	21
$9.00	20	22

References

Pew Research Center. “Pew Research: Center for the People & the Press.” http://www.people-press.org/.

Price Ceilings and Price Floors

By the end of this section, you will be able to:

- Explain price controls, price ceilings, and price floors
- Analyze demand and supply as a social adjustment mechanism

Controversy sometimes surrounds the prices and quantities established by demand and supply, especially for products that are considered necessities. In some cases, discontent over prices turns into public pressure on politicians, who may then pass legislation to prevent a certain price from climbing “too high” or falling “too low.”

The demand and supply model shows how people and firms will react to the incentives provided by these laws to control prices, in ways that will often lead to undesirable consequences. Alternative policy tools can often achieve the desired goals of price control laws, while avoiding at least some of their costs and tradeoffs.

Price Ceilings

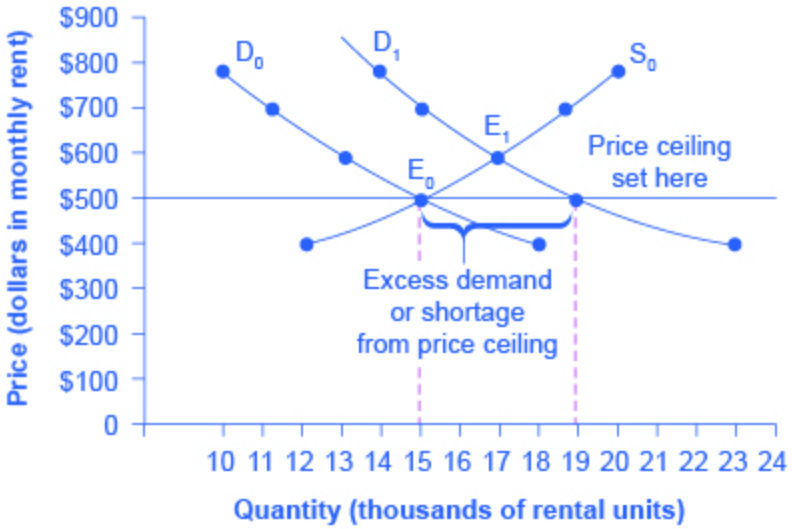
Laws that government enacts to regulate prices are called **Price controls**. Price controls come in two flavors. A **price ceiling** keeps a price from rising above a certain level (the “ceiling”), while a **price floor** keeps a price from falling below a certain level (the “floor”). This section uses the demand and supply framework to analyze price ceilings. The next section discusses price floors.

In many markets for goods and services, demanders outnumber suppliers. Consumers, who are also potential voters, sometimes unite behind a political proposal to hold down a certain price. In some cities, such as Albany, renters have pressed political leaders to pass rent control laws, a price ceiling that usually works by stating that rents can be raised by only a certain maximum percentage each year.

Rent control becomes a politically hot topic when rents begin to rise rapidly. Everyone needs an affordable place to live. Perhaps a change in tastes makes a certain suburb or town a more popular place to live. Perhaps

locally-based businesses expand, bringing higher incomes and more people into the area. Changes of this sort can cause a change in the demand for rental housing, as [link] illustrates. The original equilibrium (E_0) lies at the intersection of supply curve S_0 and demand curve D_0, corresponding to an equilibrium price of $500 and an equilibrium quantity of 15,000 units of rental housing. The effect of greater income or a change in tastes is to shift the demand curve for rental housing to the right, as shown by the data in [link] and the shift from D_0 to D_1 on the graph. In this market, at the new equilibrium E_1, the price of a rental unit would rise to $600 and the equilibrium quantity would increase to 17,000 units.

A Price Ceiling Example—Rent Control



The original intersection of demand and supply occurs at E_0. If demand shifts from D_0 to D_1, the new equilibrium would be at E_1—unless a price ceiling prevents the price from rising. If the price is not permitted to rise, the quantity supplied remains at 15,000. However, after the change in demand, the quantity demanded rises to 19,000, resulting in a shortage.

Price	Original Quantity Supplied	Original Quantity Demanded	New Quantity Demanded
$400	12,000	18,000	23,000
$500	15,000	15,000	19,000
$600	17,000	13,000	17,000
$700	19,000	11,000	15,000
$800	20,000	10,000	14,000

Rent Control

Suppose that a rent control law is passed to keep the price at the original equilibrium of $500 for a typical apartment. In [link], the horizontal line at the price of $500 shows the legally fixed maximum price set by the rent control law. However, the underlying forces that shifted the demand curve to the right are still there. At that price ($500), the quantity supplied remains at the same 15,000 rental units, but the quantity demanded is 19,000 rental units. In other words, the quantity demanded exceeds the quantity supplied, so there is a shortage of rental housing. One of the ironies of price ceilings is that while the price ceiling was intended to help renters, there are actually fewer apartments rented out under the price ceiling (15,000 rental units) than would be the case at the market rent of $600 (17,000 rental units).

Price ceilings do not simply benefit renters at the expense of landlords. Rather, some renters (or potential renters) lose their housing as landlords convert apartments to co-ops and condos. Even when the housing remains in the rental market, landlords tend to spend less on maintenance and on essentials like heating, cooling, hot water, and lighting. The first rule of economics is you do not get something for nothing—everything has an opportunity cost. So if renters get “cheaper” housing than the market requires, they tend to also end up with lower quality housing.

Price ceilings have been proposed for other products. For example, price ceilings to limit what producers can charge have been proposed in recent years for prescription drugs, doctor and hospital fees, the charges made by some automatic teller bank machines, and auto insurance rates. Price ceilings are enacted in an attempt to keep prices low for those who demand the product. But when the market price is not allowed to rise to the equilibrium level, quantity demanded exceeds quantity supplied, and thus a shortage occurs. Those who manage to purchase the product at the lower price given by the price ceiling will benefit, but sellers of the product will suffer, along with those who are not able to purchase the product at all. Quality is also likely to deteriorate.

Price Floors

A price floor is the lowest legal price that can be paid in markets for goods and services, labor, or financial capital. Perhaps the best-known example of a price floor is the minimum wage, which is based on the normative view that someone working full time ought to be able to afford a basic standard of living. The federal minimum wage at the end of 2014 was $7.25 per hour, which yields an income for a single person slightly higher than the poverty line. As the cost of living rises over time, the Congress periodically raises the federal minimum wage.

Price floors are sometimes called “price supports,” because they support a price by preventing it from falling below a certain level. Around the world, many countries have passed laws to create agricultural price supports. Farm prices and thus farm incomes fluctuate, sometimes widely. So even if, on average, farm incomes are adequate, some years they can be quite low. The purpose of price supports is to prevent these swings.

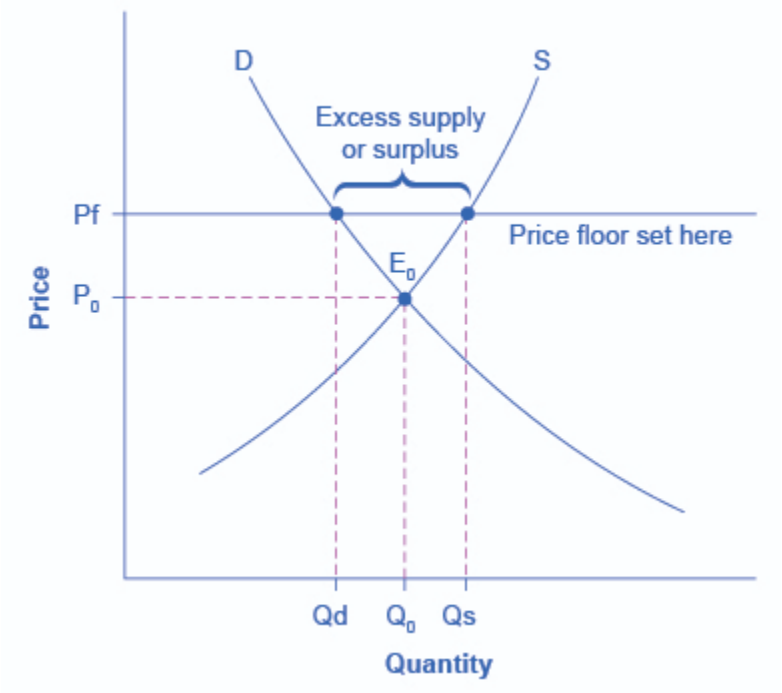
The most common way price supports work is that the government enters the market and buys up the product, adding to demand to keep prices higher than they otherwise would be. According to the Common Agricultural Policy reform passed in 2013, the European Union (EU) will spend about 60 billion euros per year, or 67 billion dollars per year, or roughly 38% of the EU budget, on price supports for Europe’s farmers from 2014 to 2020.

[link] illustrates the effects of a government program that assures a price above the equilibrium by focusing on the market for wheat in Europe. In the absence of government intervention, the price would adjust so that the quantity supplied would equal the quantity demanded at the equilibrium point E_0, with price P_0 and quantity Q_0. However, policies to keep prices high for farmers keeps the price above what would have been the market equilibrium level—the price Pf shown by the dashed horizontal line in the diagram. The result is a quantity supplied in excess of the quantity demanded (Qd). When quantity supplied exceeds quantity demanded, a surplus exists.

The high-income areas of the world, including the United States, Europe, and Japan, are estimated to spend roughly $1 billion per day in supporting their farmers. If the government is willing to purchase the excess supply (or to provide payments for others to purchase it), then farmers will benefit from the price floor, but taxpayers and consumers of food will pay the costs. Numerous proposals have been offered for reducing farm subsidies. In many countries, however, political support for subsidies for farmers remains strong. Either because this is viewed by the population as supporting the traditional rural way of life or because of the lobbying power of the agro-business industry.

For more detail on the effects price ceilings and floors have on demand and supply, see the following Clear It Up feature.

European Wheat Prices: A Price Floor Example



The intersection of demand (D) and supply (S) would be at the equilibrium point E_0. However, a price floor set at Pf holds the price above E_0 and prevents it from falling. The result of the price floor is that the quantity supplied Qs exceeds the quantity demanded Qd. There is excess supply, also called a surplus.

Note:

Do price ceilings and floors change demand or supply?

Neither price ceilings nor price floors cause demand or supply to change. They simply set a price that limits what can be legally charged in the market. Remember, changes in price do not cause demand or supply to change. Price ceilings and price floors can cause a different choice of quantity demanded along a demand curve, but they do not move the

demand curve. Price controls can cause a different choice of quantity supplied along a supply curve, but they do not shift the supply curve.

Key Concepts and Summary

Price ceilings prevent a price from rising above a certain level. When a price ceiling is set below the equilibrium price, quantity demanded will exceed quantity supplied, and excess demand or shortages will result. Price floors prevent a price from falling below a certain level. When a price floor is set above the equilibrium price, quantity supplied will exceed quantity demanded, and excess supply or surpluses will result. Price floors and price ceilings often lead to unintended consequences.

Self-Check Questions

Exercise:

Problem:

What is the effect of a price ceiling on the quantity demanded of the product? What is the effect of a price ceiling on the quantity supplied? Why exactly does a price ceiling cause a shortage?

Solution:

A price ceiling (which is below the equilibrium price) will cause the quantity demanded to rise and the quantity supplied to fall. This is why a price ceiling creates a shortage.

Exercise:

Problem: Does a price ceiling change the equilibrium price?

Solution:

A price ceiling is just a legal restriction. Equilibrium is an economic condition. People may or may not obey the price ceiling, so the actual price may be at or above the price ceiling, but the price ceiling does not change the equilibrium price.

Exercise:

Problem:

What would be the impact of imposing a price floor below the equilibrium price?

Solution:

A price ceiling is a legal maximum price, but a price floor is a legal minimum price and, consequently, it would leave room for the price to rise to its equilibrium level. In other words, a price floor below equilibrium will not be binding and will have no effect.

Review Questions

Exercise:

Problem:

Does a price ceiling attempt to make a price higher or lower?

Exercise:

Problem:

How does a price ceiling set below the equilibrium level affect quantity demanded and quantity supplied?

Exercise:

Problem: Does a price floor attempt to make a price higher or lower?

Exercise:

Problem:

How does a price floor set above the equilibrium level affect quantity demanded and quantity supplied?

Critical Thinking Questions

Exercise:

Problem:

Most government policy decisions have winners and losers. What are the effects of raising the minimum wage? It is more complex than simply producers lose and workers gain. Who are the winners and who are the losers, and what exactly do they win and lose? To what extent does the policy change achieve its goals?

Exercise:

Problem:

Agricultural price supports result in governments holding large inventories of agricultural products. Why do you think the government cannot simply give the products away to poor people?

Exercise:

Problem:

Can you propose a policy that would induce the market to supply more rental housing units?

Problems

Exercise:

Problem:

A low-income country decides to set a price ceiling on bread so it can make sure that bread is affordable to the poor. The conditions of demand and supply are given in [link]. What are the equilibrium price and equilibrium quantity before the price ceiling? What will the excess demand or the shortage (that is, quantity demanded minus quantity supplied) be if the price ceiling is set at $2.40? At $2.00? At $3.60?

Price	Qd	Qs
$1.60	9,000	5,000
$2.00	8,500	5,500
$2.40	8,000	6,400
$2.80	**7,500**	**7,500**
$3.20	7,000	9,000
$3.60	6,500	11,000
$4.00	6,000	15,000

Glossary

price ceiling
: a legal maximum price

price control
: government laws to regulate prices instead of letting market forces determine prices

price floor
: a legal minimum price

total surplus
: see social surplus

Demand, Supply, and Efficiency
By the end of this section, you will be able to:

- Contrast consumer surplus, producer surplus, and social surplus
- Explain why price floors and price ceilings can be inefficient
- Analyze demand and supply as a social adjustment mechanism

The familiar demand and supply diagram holds within it the concept of economic efficiency. One typical way that economists define efficiency is when it is impossible to improve the situation of one party without imposing a cost on another. Conversely, if a situation is inefficient, it becomes possible to benefit at least one party without imposing costs on others.

Efficiency in the demand and supply model has the same basic meaning: The economy is getting as much benefit as possible from its scarce resources and all the possible gains from trade have been achieved. In other words, the optimal amount of each good and service is being produced and consumed.

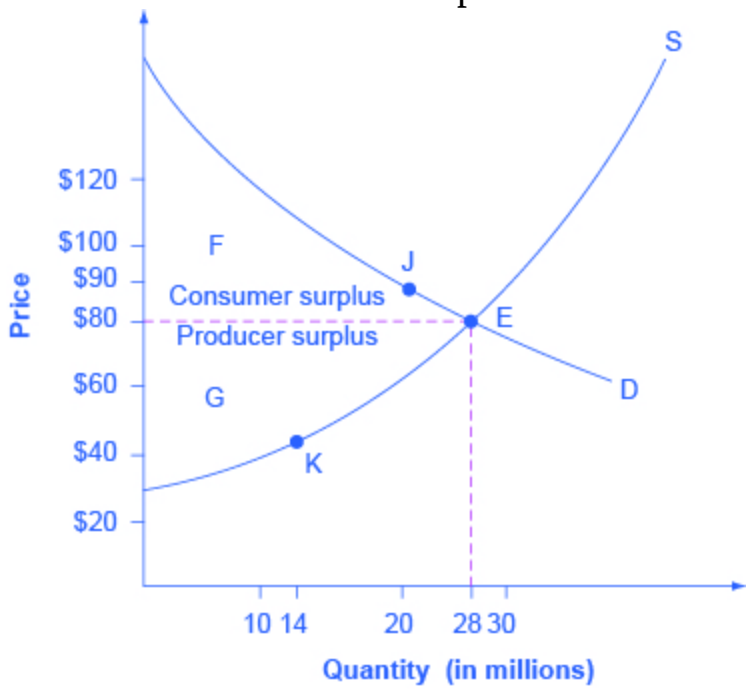
Consumer Surplus, Producer Surplus, Social Surplus

Consider a market for tablet computers, as shown in [link]. The equilibrium price is $80 and the equilibrium quantity is 28 million. To see the benefits to consumers, look at the segment of the demand curve above the equilibrium point and to the left. This portion of the demand curve shows that at least some demanders would have been willing to pay more than $80 for a tablet.

For example, point J shows that if the price was $90, 20 million tablets would be sold. Those consumers who would have been willing to pay $90 for a tablet based on the utility they expect to receive from it, but who were able to pay the equilibrium price of $80, clearly received a benefit beyond what they had to pay for. Remember, the demand curve traces consumers' willingness to pay for different quantities. The amount that individuals would have been willing to pay, minus the amount that they actually paid, is

called **consumer surplus**. Consumer surplus is the area labeled F—that is, the area above the market price and below the demand curve.

Consumer and Producer Surplus



The somewhat triangular area labeled by F shows the area of consumer surplus, which shows that the equilibrium price in the market was less than what many of the consumers were willing to pay. Point J on the demand curve shows that, even at the price of $90, consumers would have been willing to purchase a quantity of 20 million. The somewhat triangular area labeled by G shows the area of producer surplus, which shows that the equilibrium price received in the market was more than what many of the producers were willing to accept for their products. For example, point K on the supply curve shows that at a price of $45, firms would have been willing to supply a quantity of 14 million.

The supply curve shows the quantity that firms are willing to supply at each price. For example, point K in [link] illustrates that, at $45, firms would still have been willing to supply a quantity of 14 million. Those producers who would have been willing to supply the tablets at $45, but who were instead able to charge the equilibrium price of $80, clearly received an extra benefit beyond what they required to supply the product. The amount that a seller is paid for a good minus the seller's actual cost is called **producer surplus**. In [link], producer surplus is the area labeled G—that is, the area between the market price and the segment of the supply curve below the equilibrium.

The sum of consumer surplus and producer surplus is **social surplus**, also referred to as **economic surplus** or **total surplus**. In [link], social surplus would be shown as the area F + G. Social surplus is larger at equilibrium quantity and price than it would be at any other quantity. This demonstrates the economic efficiency of the market equilibrium. In addition, at the efficient level of output, it is impossible to produce greater consumer surplus without reducing producer surplus, and it is impossible to produce greater producer surplus without reducing consumer surplus.

Inefficiency of Price Floors and Price Ceilings

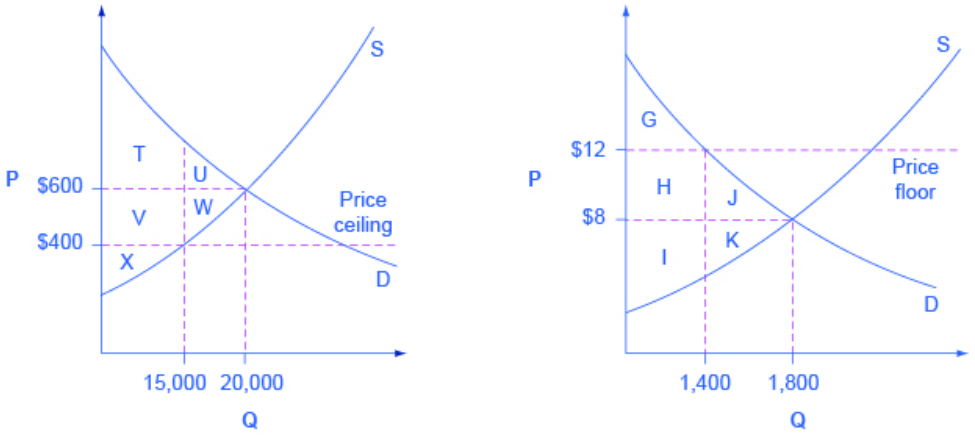
The imposition of a price floor or a price ceiling will prevent a market from adjusting to its equilibrium price and quantity, and thus will create an inefficient outcome. But there is an additional twist here. Along with creating inefficiency, price floors and ceilings will also transfer some consumer surplus to producers, or some producer surplus to consumers.

Imagine that several firms develop a promising but expensive new drug for treating back pain. If this therapy is left to the market, the equilibrium price will be $600 per month and 20,000 people will use the drug, as shown in [link] (a). The original level of consumer surplus is T + U and producer surplus is V + W + X. However, the government decides to impose a price ceiling of $400 to make the drug more affordable. At this price ceiling, firms in the market now produce only 15,000.

As a result, two changes occur. First, an inefficient outcome occurs and the total surplus of society is reduced. The loss in social surplus that occurs when the economy produces at an inefficient quantity is called **deadweight loss**. In a very real sense, it is like money thrown away that benefits no one. In [link] (a), the deadweight loss is the area U + W. When deadweight loss exists, it is possible for both consumer and producer surplus to be higher, in this case because the price control is blocking some suppliers and demanders from transactions they would both be willing to make.

A second change from the price ceiling is that some of the producer surplus is transferred to consumers. After the price ceiling is imposed, the new consumer surplus is T + V, while the new producer surplus is X. In other words, the price ceiling transfers the area of surplus (V) from producers to consumers. Note that the gain to consumers is less than the loss to producers, which is just another way of seeing the deadweight loss.

Efficiency and Price Floors and Ceilings



(a) Reduced social surplus from a price ceiling

(b) Reduced social surplus from a price floor

(a) The original equilibrium price is $600 with a quantity of 20,000. Consumer surplus is T + U, and producer surplus is V + W + X. A price ceiling is imposed at $400, so firms in the market now produce only a quantity of 15,000. As a result, the new consumer surplus is T + V, while the new producer surplus is X. (b) The original equilibrium is $8 at a quantity of 1,800. Consumer surplus is G + H + J, and producer surplus is I + K. A price floor is imposed at $12, which means that quantity demanded falls to 1,400. As a result, the new consumer surplus is G, and the new producer surplus is H + I.

[link] (b) shows a price floor example using a string of struggling movie theaters, all in the same city. The current equilibrium is $8 per movie ticket, with 1,800 people attending movies. The original consumer surplus is G + H + J, and producer surplus is I + K. The city government is worried that movie theaters will go out of business, reducing the entertainment options available to citizens, so it decides to impose a price floor of $12 per ticket. As a result, the quantity demanded of movie tickets falls to 1,400. The new consumer surplus is G, and the new producer surplus is H + I. In effect, the price floor causes the area H to be transferred from consumer to producer surplus, but also causes a deadweight loss of J + K.

This analysis shows that a price ceiling, like a law establishing rent controls, will transfer some producer surplus to consumers—which helps to explain why consumers often favor them. Conversely, a price floor like a guarantee that farmers will receive a certain price for their crops will transfer some consumer surplus to producers, which explains why producers often favor them. However, both price floors and price ceilings block some transactions that buyers and sellers would have been willing to make, and creates deadweight loss. Removing such barriers, so that prices and quantities can adjust to their equilibrium level, will increase the economy's social surplus.

Demand and Supply as a Social Adjustment Mechanism

The demand and supply model emphasizes that prices are not set only by demand or only by supply, but by the interaction between the two. In 1890, the famous economist Alfred Marshall wrote that asking whether supply or demand determined a price was like arguing "whether it is the upper or the under blade of a pair of scissors that cuts a piece of paper." The answer is that both blades of the demand and supply scissors are always involved.

The adjustments of equilibrium price and quantity in a market-oriented economy often occur without much government direction or oversight. If the coffee crop in Brazil suffers a terrible frost, then the supply curve of

coffee shifts to the left and the price of coffee rises. Some people—call them the coffee addicts—continue to drink coffee and pay the higher price. Others switch to tea or soft drinks. No government commission is needed to figure out how to adjust coffee prices, which companies will be allowed to process the remaining supply, which supermarkets in which cities will get how much coffee to sell, or which consumers will ultimately be allowed to drink the brew. Such adjustments in response to price changes happen all the time in a market economy, often so smoothly and rapidly that we barely notice them.

Think for a moment of all the seasonal foods that are available and inexpensive at certain times of the year, like fresh corn in midsummer, but more expensive at other times of the year. People alter their diets and restaurants alter their menus in response to these fluctuations in prices without fuss or fanfare. For both the U.S. economy and the world economy as a whole, markets—that is, demand and supply—are the primary social mechanism for answering the basic questions about what is produced, how it is produced, and for whom it is produced.

Note:

Why Can We Not Get Enough of Organic?

Organic food is grown without synthetic pesticides, chemical fertilizers or genetically modified seeds. In recent decades, the demand for organic products has increased dramatically. The Organic Trade Association reported sales increased from $1 billion in 1990 to $35.1 billion in 2013, more than 90% of which were sales of food products.

Why, then, are organic foods more expensive than their conventional counterparts? The answer is a clear application of the theories of supply and demand. As people have learned more about the harmful effects of chemical fertilizers, growth hormones, pesticides and the like from large-scale factory farming, our tastes and preferences for safer, organic foods have increased. This change in tastes has been reinforced by increases in income, which allow people to purchase pricier products, and has made organic foods more mainstream. This has led to an increased demand for organic foods. Graphically, the demand curve has shifted right, and we

have moved up the supply curve as producers have responded to the higher prices by supplying a greater quantity.
In addition to the movement along the supply curve, we have also had an increase in the number of farmers converting to organic farming over time. This is represented by a shift to the right of the supply curve. Since both demand and supply have shifted to the right, the resulting equilibrium quantity of organic foods is definitely higher, but the price will only fall when the increase in supply is larger than the increase in demand. We may need more time before we see lower prices in organic foods. Since the production costs of these foods may remain higher than conventional farming, because organic fertilizers and pest management techniques are more expensive, they may never fully catch up with the lower prices of non-organic foods.
As a final, specific example: The Environmental Working Group's "Dirty Dozen" list of fruits and vegetables, which test high for pesticide residue even after washing, was released in April 2013. The inclusion of strawberries on the list has led to an increase in demand for organic strawberries, resulting in both a higher equilibrium price and quantity of sales.

Consumer surplus is the gap between the price that consumers are willing to pay, based on their preferences, and the market equilibrium price. Producer surplus is the gap between the price for which producers are willing to sell a product, based on their costs, and the market equilibrium price. Social surplus is the sum of consumer surplus and producer surplus. Total surplus is larger at the equilibrium quantity and price than it will be at any other quantity and price. Deadweight loss is loss in total surplus that occurs when the economy produces at an inefficient quantity.

Exercise:

Problem:

Does a price ceiling increase or decrease the number of transactions in a market? Why? What about a price floor?

Solution:

Assuming that people obey the price ceiling, the market price will be below equilibrium, which means that Qd will be more than Qs. Buyers can only buy what is offered for sale, so the number of transactions will fall to Qs. This is easy to see graphically. By analogous reasoning, with a price floor the market price will be above the equilibrium price, so Qd will be less than Qs. Since the limit on transactions here is demand, the number of transactions will fall to Qd. Note that because both price floors and price ceilings reduce the number of transactions, social surplus is less.

Exercise:

Problem:

If a price floor benefits producers, why does a price floor reduce social surplus?

Solution:

Because the losses to consumers are greater than the benefits to producers, so the net effect is negative. Since the lost consumer surplus is greater than the additional producer surplus, social surplus falls.

Exercise:

Problem:

What is consumer surplus? How is it illustrated on a demand and supply diagram?

Exercise:

Problem:

What is producer surplus? How is it illustrated on a demand and supply diagram?

Exercise:

Problem:

What is total surplus? How is it illustrated on a demand and supply diagram?

Exercise:

Problem:

What is the relationship between total surplus and economic efficiency?

Exercise:

Problem: What is deadweight loss?

Exercise:

Problem:

What term would an economist use to describe what happens when a shopper gets a “good deal” on a product?

Exercise:

Problem: Explain why voluntary transactions improve social welfare.

Exercise:

Problem:

Why would a free market never operate at a quantity greater than the equilibrium quantity? *Hint:* What would be required for a transaction to occur at that quantity?

Glossary

consumer surplus
: the extra benefit consumers receive from buying a good or service, measured by what the individuals would have been willing to pay

minus the amount that they actually paid

deadweight loss
: the loss in social surplus that occurs when a market produces an inefficient quantity

economic surplus
: see social surplus

producer surplus
: the extra benefit producers receive from selling a good or service, measured by the price the producer actually received minus the price the producer would have been willing to accept

social surplus
: the sum of consumer surplus and producer surplus

Introduction to Labor and Financial Markets
class="introduction"

People often think of demand and supply in relation to goods, but labor markets, such as the nursing profession, can also apply to this analysis. (Credit: modification of work by "Fotos GOVBA"/Flickr Creative Commons)



Note:

Baby Boomers Come of Age

The Census Bureau reports that as of 2013, 20% of the U.S. population was over 60 years old, which means that almost 63 million people are reaching an age when they will need increased medical care.

The baby boomer population, the group born between 1946 and 1964, is comprised of approximately 74 million people who have just reached retirement age. As this population grows older, they will be faced with common healthcare issues such as heart conditions, arthritis, and Alzheimer's that may require hospitalization, long-term, or at-home nursing care. Aging baby boomers and advances in life-saving and life-extending technologies will increase the demand for healthcare and nursing. Additionally, the Affordable Care Act, which expands access to healthcare for millions of Americans, will further increase the demand. According to the Bureau of Labor Statistics, registered nursing jobs are expected to increase by 19% between 2012 and 2022. The median annual wage of $67,930 (in 2012) is also expected to increase. The BLS forecasts that 526,000 new nurses will be needed by 2022. One concern is the low rate of enrollment in nursing programs to help meet the growing demand. According to the American Association of Colleges of Nursing (AACN), enrollment in 2011 increased by only 5.1% due to a shortage of nursing educators and teaching facilities.

These data tell us, as economists, that the market for healthcare professionals, and nurses in particular, will face several challenges. Our study of supply and demand will help us to analyze what might happen in the labor market for nursing and other healthcare professionals, as discussed in the second half of this case at the end of the chapter.

Note:

Introduction to Labor and Financial Markets

In this chapter, you will learn about:

- Demand and Supply at Work in Labor Markets
- Demand and Supply in Financial Markets
- The Market System as an Efficient Mechanism for Information

The theories of supply and demand do not apply just to markets for goods. They apply to any market, even markets for labor and financial services. Labor markets are markets for employees or jobs. Financial services markets are markets for saving or borrowing.

When we think about demand and supply curves in goods and services markets, it is easy to picture who the demanders and suppliers are: businesses produce the products and households buy them. Who are the demanders and suppliers in labor and financial service markets? In labor markets job seekers (individuals) are the suppliers of labor, while firms and other employers who hire labor are the demanders for labor. In financial markets, any individual or firm who saves contributes to the supply of money, and any who borrows (person, firm, or government) contributes to the demand for money.

As a college student, you most likely participate in both labor and financial markets. Employment is a fact of life for most college students: In 2011, says the BLS, 52% of undergraduates worked part time and another 20% worked full time. Most college students are also heavily involved in financial markets, primarily as borrowers. Among full-time students, about half take out a loan to help finance their education each year, and those loans average about $6,000 per year. Many students also borrow for other expenses, like purchasing a car. As this chapter will illustrate, we can analyze labor markets and financial markets with the same tools we use to analyze demand and supply in the goods markets.

Demand and Supply at Work in Labor Markets

By the end of this section, you will be able to:

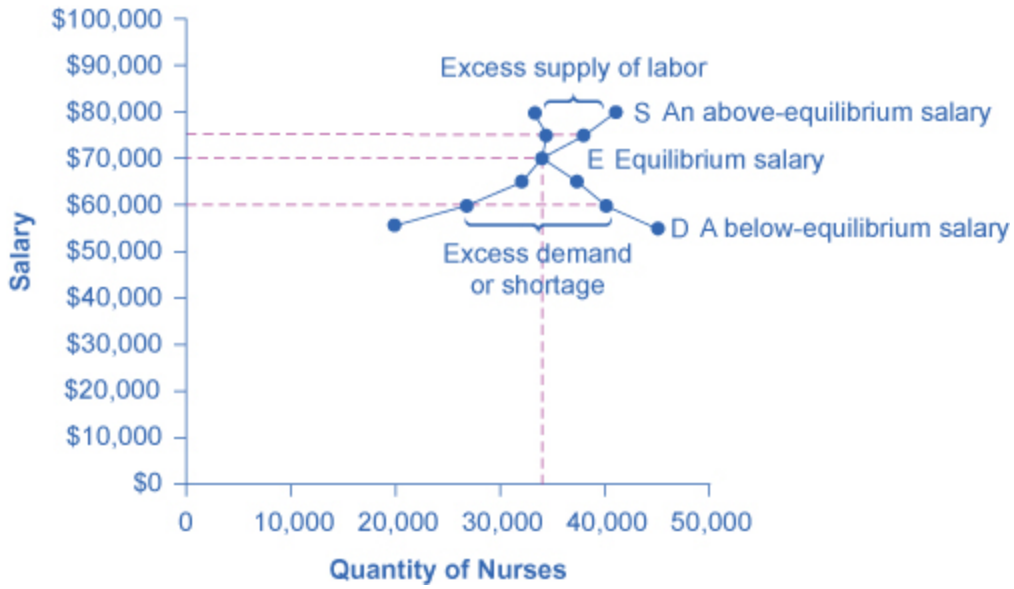
- Predict shifts in the demand and supply curves of the labor market
- Explain the impact of new technology on the demand and supply curves of the labor market
- Explain price floors in the labor market such as minimum wage or a living wage

Markets for labor have demand and supply curves, just like markets for goods. The law of demand applies in labor markets this way: A higher **salary** or **wage**—that is, a higher price in the labor market—leads to a decrease in the quantity of labor demanded by employers, while a lower salary or wage leads to an increase in the quantity of labor demanded. The law of supply functions in labor markets, too: A higher price for labor leads to a higher quantity of labor supplied; a lower price leads to a lower quantity supplied.

Equilibrium in the Labor Market

In 2013, about 34,000 registered nurses worked in the Minneapolis-St. Paul-Bloomington, Minnesota-Wisconsin metropolitan area, according to the BLS. They worked for a variety of employers: hospitals, doctors' offices, schools, health clinics, and nursing homes. [link] illustrates how demand and supply determine equilibrium in this labor market. The demand and supply schedules in [link] list the quantity supplied and quantity demanded of nurses at different salaries.

Labor Market Example: Demand and Supply for Nurses in Minneapolis-St. Paul-Bloomington



The demand curve (D) of those employers who want to hire nurses intersects with the supply curve (S) of those who are qualified and willing to work as nurses at the equilibrium point (E). The equilibrium salary is $70,000 and the equilibrium quantity is 34,000 nurses. At an above-equilibrium salary of $75,000, quantity supplied increases to 38,000, but the quantity of nurses demanded at the higher pay declines to 33,000. At this above-equilibrium salary, an excess supply or surplus of nurses would exist. At a below-equilibrium salary of $60,000, quantity supplied declines to 27,000, while the quantity demanded at the lower wage increases to 40,000 nurses. At this below-equilibrium salary, excess demand or a shortage exists.

Annual Salary	Quantity Demanded	Quantity Supplied

Annual Salary	Quantity Demanded	Quantity Supplied
$55,000	45,000	20,000
$60,000	40,000	27,000
$65,000	37,000	31,000
$70,000	34,000	34,000
$75,000	33,000	38,000
$80,000	32,000	41,000

Demand and Supply of Nurses in Minneapolis-St. Paul-Bloomington

The horizontal axis shows the quantity of nurses hired. In this example, labor is measured by number of workers, but another common way to measure the quantity of labor is by the number of hours worked. The vertical axis shows the price for nurses' labor—that is, how much they are paid. In the real world, this "price" would be total labor compensation: salary plus benefits. It is not obvious, but benefits are a significant part (as high as 30 percent) of labor compensation. In this example, the price of labor is measured by salary on an annual basis, although in other cases the price of labor could be measured by monthly or weekly pay, or even the wage paid per hour. As the salary for nurses rises, the quantity demanded will fall. Some hospitals and nursing homes may cut back on the number of nurses they hire, or they may lay off some of their existing nurses, rather than pay them higher salaries. Employers who face higher nurses' salaries may also try to replace some nursing functions by investing in physical equipment, like computer monitoring and diagnostic systems to monitor patients, or by using lower-paid health care aides to reduce the number of nurses they need.

As the salary for nurses rises, the quantity supplied will rise. If nurses' salaries in Minneapolis-St. Paul-Bloomington are higher than in other cities, more nurses will move to Minneapolis-St. Paul-Bloomington to find jobs,

more people will be willing to train as nurses, and those currently trained as nurses will be more likely to pursue nursing as a full-time job. In other words, there will be more nurses looking for jobs in the area.

At **equilibrium**, the quantity supplied and the quantity demanded are equal. Thus, every employer who wants to hire a nurse at this equilibrium wage can find a willing worker, and every nurse who wants to work at this equilibrium salary can find a job. In [link], the supply curve (S) and demand curve (D) intersect at the equilibrium point (E). The equilibrium quantity of nurses in the Minneapolis-St. Paul-Bloomington area is 34,000, and the equilibrium salary is $70,000 per year. This example simplifies the nursing market by focusing on the "average" nurse. In reality, of course, the market for nurses is actually made up of many smaller markets, like markets for nurses with varying degrees of experience and credentials. Many markets contain closely related products that differ in quality; for instance, even a simple product like gasoline comes in regular, premium, and super-premium, each with a different price. Even in such cases, discussing the average price of gasoline, like the average salary for nurses, can still be useful because it reflects what is happening in most of the submarkets.

When the price of labor is not at the equilibrium, economic incentives tend to move salaries toward the equilibrium. For example, if salaries for nurses in Minneapolis-St. Paul-Bloomington were above the equilibrium at $75,000 per year, then 38,000 people want to work as nurses, but employers want to hire only 33,000 nurses. At that above-equilibrium salary, excess supply or a surplus results. In a situation of excess supply in the **labor market**, with many applicants for every job opening, employers will have an incentive to offer lower wages than they otherwise would have. Nurses' salary will move down toward equilibrium.

In contrast, if the salary is below the equilibrium at, say, $60,000 per year, then a situation of excess demand or a shortage arises. In this case, employers encouraged by the relatively lower wage want to hire 40,000 nurses, but only 27,000 individuals want to work as nurses at that salary in Minneapolis-St. Paul-Bloomington. In response to the shortage, some employers will offer higher pay to attract the nurses. Other employers will have to match the higher pay to keep their own employees. The higher

salaries will encourage more nurses to train or work in Minneapolis-St. Paul-Bloomington. Again, price and quantity in the labor market will move toward equilibrium.

Shifts in Labor Demand

The demand curve for labor shows the quantity of labor employers wish to hire at any given salary or wage rate, under the *ceteris paribus* assumption. A change in the wage or salary will result in a change in the quantity demanded of labor. If the wage rate increases, employers will want to hire fewer employees. The quantity of labor demanded will decrease, and there will be a movement upward along the demand curve. If the wages and salaries decrease, employers are more likely to hire a greater number of workers. The quantity of labor demanded will increase, resulting in a downward movement along the demand curve.

Shifts in the demand curve for labor occur for many reasons. One key reason is that the demand for labor is based on the demand for the good or service that is being produced. For example, the more new automobiles consumers demand, the greater the number of workers automakers will need to hire. Therefore the demand for labor is called a "derived demand." Here are some examples of derived demand for labor:

- The demand for chefs is dependent on the demand for restaurant meals.
- The demand for pharmacists is dependent on the demand for prescription drugs.
- The demand for attorneys is dependent on the demand for legal services.

As the demand for the goods and services increases, the demand for labor will increase, or shift to the right, to meet employers' production requirements. As the demand for the goods and services decreases, the demand for labor will decrease, or shift to the left. [link] shows that in addition to the derived demand for labor, demand can also increase or decrease (shift) in response to several factors.

Factors	Results
Demand for Output	When the demand for the good produced (output) increases, both the output price and profitability increase. As a result, producers demand more labor to ramp up production.
Education and Training	A well-trained and educated workforce causes an increase in the demand for that labor by employers. Increased levels of productivity within the workforce will cause the demand for labor to shift to the right. If the workforce is not well-trained or educated, employers will not hire from within that labor pool, since they will need to spend a significant amount of time and money training that workforce. Demand for such will shift to the left.

Factors	Results
Technology	Technology changes can act as either substitutes for or complements to labor. When technology acts as a substitute, it replaces the need for the number of workers an employer needs to hire. For example, word processing decreased the number of typists needed in the workplace. This shifted the demand curve for typists left. An increase in the availability of certain technologies may increase the demand for labor. Technology that acts as a complement to labor will increase the demand for certain types of labor, resulting in a rightward shift of the demand curve. For example, the increased use of word processing and other software has increased the demand for information technology professionals who can resolve software and hardware issues related to a firm's network. More and better technology will increase demand for skilled workers who know how to use technology to enhance workplace productivity. Those workers who do not adapt to changes in technology will experience a decrease in demand.
Number of Companies	An increase in the number of companies producing a given product will increase the demand for labor resulting in a shift to the right. A decrease in the number of companies producing a given product will decrease the demand for labor resulting in a shift to the left.

Factors	Results
Government Regulations	Complying with government regulations can increase or decrease the demand for labor at any given wage. In the healthcare industry, government rules may require that nurses be hired to carry out certain medical procedures. This will increase the demand for nurses. Less-trained healthcare workers would be prohibited from carrying out these procedures, and the demand for these workers will shift to the left.
Price and Availability of Other Inputs	Labor is not the only input into the production process. For example, a salesperson at a call center needs a telephone and a computer terminal to enter data and record sales. The demand for salespersons at the call center will increase if the number of telephones and computer terminals available increases. This will cause a rightward shift of the demand curve. As the amount of inputs increases, the demand for labor will increase. If the terminal or the telephones malfunction, then the demand for that labor force will decrease. As the quantity of other inputs decreases, the demand for labor will decrease. Similarly, if prices of other inputs fall, production will become more profitable and suppliers will demand more labor to increase production. The opposite is also true. Higher input prices lower demand for labor

Factors That Can Shift Demand

Note:
Click here to read more about "Trends and Challenges for Work in the 21st Century."



Shifts in Labor Supply

The supply of labor is upward-sloping and adheres to the law of supply: The higher the price, the greater the quantity supplied and the lower the price, the less quantity supplied. The supply curve models the tradeoff between supplying labor into the market or using time in leisure activities at every given price level. The higher the wage, the more labor is willing to work and forego leisure activities. [link] lists some of the factors that will cause the supply to increase or decrease.

Factors	Results

Factors	Results
Number of Workers	An increased number of workers will cause the supply curve to shift to the right. An increased number of workers can be due to several factors, such as immigration, increasing population, an aging population, and changing demographics. Policies that encourage immigration will increase the supply of labor, and vice versa. Population grows when birth rates exceed death rates; this eventually increases supply of labor when the former reach working age. An aging and therefore retiring population will decrease the supply of labor. Another example of changing demographics is more women working outside of the home, which increases the supply of labor.
Required Education	The more required education, the lower the supply. There is a lower supply of PhD mathematicians than of high school mathematics teachers; there is a lower supply of cardiologists than of primary care physicians; and there is a lower supply of physicians than of nurses.

Factors	Results
Government Policies	Government policies can also affect the supply of labor for jobs. On the one hand, the government may support rules that set high qualifications for certain jobs: academic training, certificates or licenses, or experience. When these qualifications are made tougher, the number of qualified workers will decrease at any given wage. On the other hand, the government may also subsidize training or even reduce the required level of qualifications. For example, government might offer subsidies for nursing schools or nursing students. Such provisions would shift the supply curve of nurses to the right. In addition, government policies that change the relative desirability of working versus not working also affect the labor supply. These include unemployment benefits, maternity leave, child care benefits and welfare policy. For example, child care benefits may increase the labor supply of working mothers. Long term unemployment benefits may discourage job searching for unemployed workers. All these policies must therefore be carefully designed to minimize any negative labor supply effects.

Factors that Can Shift Supply

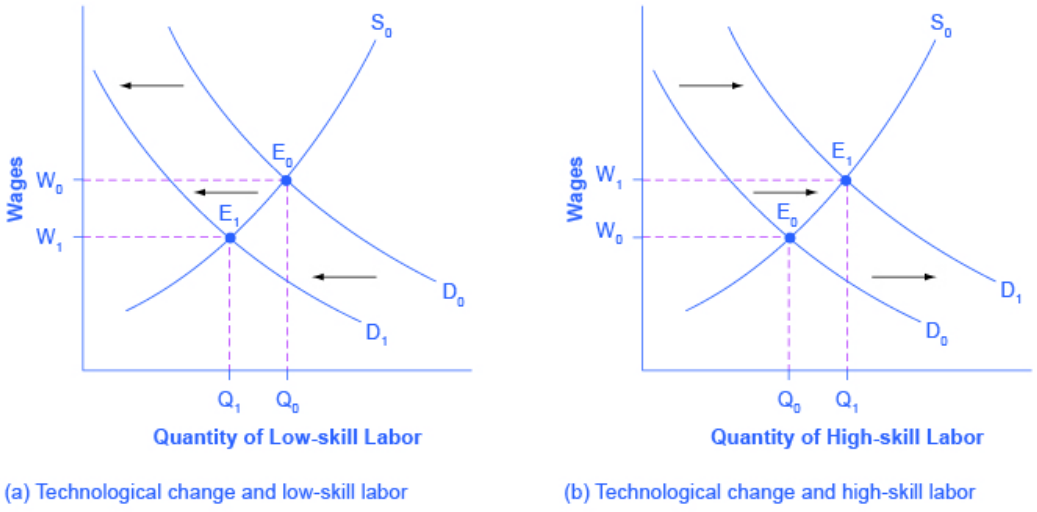
A change in salary will lead to a movement along labor demand or labor supply curves, but it will not shift those curves. However, other events like those outlined here will cause either the demand or the supply of labor to shift, and thus will move the labor market to a new equilibrium salary and quantity.

Technology and Wage Inequality: The Four-Step Process

Economic events can change the equilibrium salary (or wage) and quantity of labor. Consider how the wave of new information technologies, like computer and telecommunications networks, has affected low-skill and high-skill workers in the U.S. economy. From the perspective of employers who demand labor, these new technologies are often a substitute for low-skill laborers like file clerks who used to keep file cabinets full of paper records of transactions. However, the same new technologies are a complement to high-skill workers like managers, who benefit from the technological advances by being able to monitor more information, communicate more easily, and juggle a wider array of responsibilities. So, how will the new technologies affect the wages of high-skill and low-skill workers? For this question, the four-step process of analyzing how shifts in supply or demand affect a market (introduced in Demand and Supply) works in this way:

Step 1. What did the markets for low-skill labor and high-skill labor look like before the arrival of the new technologies? In [link] (a) and [link] (b), S_0 is the original supply curve for labor and D_0 is the original demand curve for labor in each market. In each graph, the original point of equilibrium, E_0, occurs at the price W_0 and the quantity Q_0.

Technology and Wages: Applying Demand and Supply



(a) The demand for low-skill labor shifts to the left when technology can do the job previously done by these workers. (b) New technologies can also increase the demand for high-skill labor in fields such as information technology and network administration.

Step 2. Does the new technology affect the supply of labor from households or the demand for labor from firms? The technology change described here affects demand for labor by firms that hire workers.

Step 3. Will the new technology increase or decrease demand? Based on the description earlier, as the substitute for low-skill labor becomes available, demand for low-skill labor will shift to the left, from D_0 to D_1. As the technology complement for high-skill labor becomes cheaper, demand for high-skill labor will shift to the right, from D_0 to D_1.

Step 4. The new equilibrium for low-skill labor, shown as point E_1 with price W_1 and quantity Q_1, has a lower wage and quantity hired than the original equilibrium, E_0. The new equilibrium for high-skill labor, shown as point E_1 with price W_1 and quantity Q_1, has a higher wage and quantity hired than the original equilibrium (E_0).

So, the demand and supply model predicts that the new computer and communications technologies will raise the pay of high-skill workers but reduce the pay of low-skill workers. Indeed, from the 1970s to the mid-2000s, the wage gap widened between high-skill and low-skill labor. According to the National Center for Education Statistics, in 1980, for example, a college graduate earned about 30% more than a high school graduate with comparable job experience, but by 2012, a college graduate earned about 60% more than an otherwise comparable high school graduate. Many economists believe that the trend toward greater wage inequality across the U.S. economy was primarily caused by the new technologies.

Note:
Visit this website to read about ten tech skills that have lost relevance in today's workforce.



Price Floors in the Labor Market: Living Wages and Minimum Wages

In contrast to goods and services markets, price ceilings are rare in labor markets, because rules that prevent people from earning income are not politically popular. There is one exception: sometimes limits are proposed on the high incomes of top business executives.

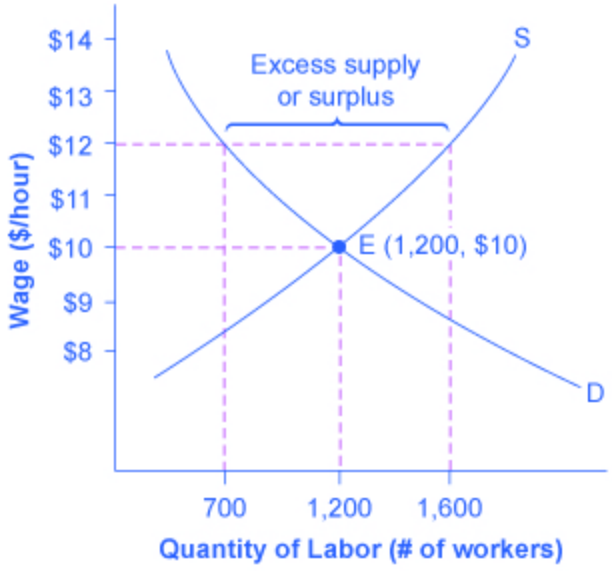
The labor market, however, presents some prominent examples of price floors, which are often used as an attempt to increase the wages of low-paid workers. The U.S. government sets a **minimum wage**, a price floor that makes it illegal for an employer to pay employees less than a certain hourly rate. In mid-2009, the U.S. minimum wage was raised to $7.25 per hour. Local political movements in a number of U.S. cities have pushed for a higher minimum wage, which they call a **living wage**. Promoters of living wage laws maintain that the minimum wage is too low to ensure a reasonable standard of living. They base this conclusion on the calculation that, if you work 40 hours a week at a minimum wage of $7.25 per hour for 50 weeks a year, your annual income is $14,500, which is less than the official U.S. government definition of what it means for a family to be in poverty. (A family with two adults earning minimum wage and two young children will find it more cost efficient for one parent to provide childcare while the other works for income. So the family income would be $14,500, which is significantly lower than the federal poverty line for a family of four, which was $23,850 in 2014.)

Supporters of the living wage argue that full-time workers should be assured a high enough wage so that they can afford the essentials of life:

food, clothing, shelter, and healthcare. Since Baltimore passed the first living wage law in 1994, several dozen cities enacted similar laws in the late 1990s and the 2000s. The living wage ordinances do not apply to all employers, but they have specified that all employees of the city or employees of firms that are hired by the city be paid at least a certain wage that is usually a few dollars per hour above the U.S. minimum wage.

[link] illustrates the situation of a city considering a living wage law. For simplicity, we assume that there is no federal minimum wage. The wage appears on the vertical axis, because the wage is the price in the labor market. Before the passage of the living wage law, the equilibrium wage is $10 per hour and the city hires 1,200 workers at this wage. However, a group of concerned citizens persuades the city council to enact a living wage law requiring employers to pay no less than $12 per hour. In response to the higher wage, 1,600 workers look for jobs with the city. At this higher wage, the city, as an employer, is willing to hire only 700 workers. At the price floor, the quantity supplied exceeds the quantity demanded, and a surplus of labor exists in this market. For workers who continue to have a job at a higher salary, life has improved. For those who were willing to work at the old wage rate but lost their jobs with the wage increase, life has not improved. [link] shows the differences in supply and demand at different wages.

A Living Wage: Example of a Price Floor



The original equilibrium in this labor market is a wage of $10/hour and a quantity of 1,200 workers, shown at point E. Imposing a wage floor at $12/hour leads to an excess supply of labor. At that wage, the quantity of labor supplied is 1,600 and the quantity of labor demanded is only 700.

Wage	Quantity Labor Demanded	Quantity Labor Supplied
$8/hr	1,900	500
$9/hr	1,500	900
$10/hr	1,200	1,200
$11/hr	900	1,400
$12/hr	700	1,600
$13/hr	500	1,800
$14/hr	400	1,900

Living Wage: Example of a Price Floor

The Minimum Wage as an Example of a Price Floor

The U.S. minimum wage is a price floor that is set either very close to the equilibrium wage or even slightly below it. About 1% of American workers are actually paid the minimum wage. In other words, the vast majority of the U.S. labor force has its wages determined in the labor market, not as a result of the government price floor. But for workers with low skills and little experience, like those without a high school diploma or teenagers, the minimum wage is quite important. In many cities, the federal minimum wage is apparently below the market price for unskilled labor, because employers offer more than the minimum wage to checkout clerks and other low-skill workers without any government prodding.

Economists have attempted to estimate how much the minimum wage reduces the quantity demanded of low-skill labor. A typical result of such studies is that a 10% increase in the minimum wage would decrease the hiring of unskilled workers by 1 to 2%, which seems a relatively small reduction. In fact, some studies have even found no effect of a higher minimum wage on employment at certain times and places—although these studies are controversial.

Let's suppose that the minimum wage lies just slightly *below* the equilibrium wage level. Wages could fluctuate according to market forces above this price floor, but they would not be allowed to move beneath the floor. In this situation, the price floor minimum wage is said to be *nonbinding* —that is, the price floor is not determining the market outcome. Even if the minimum wage moves just a little higher, it will still have no effect on the quantity of employment in the economy, as long as it remains below the equilibrium wage. Even if the minimum wage is increased by enough so that it rises slightly above the equilibrium wage and becomes binding, there will be only a small excess supply gap between the quantity demanded and quantity supplied.

These insights help to explain why U.S. minimum wage laws have historically had only a small impact on employment. Since the minimum wage has typically been set close to the equilibrium wage for low-skill labor and sometimes even below it, it has not had a large effect in creating an excess supply of labor. However, if the minimum wage were increased dramatically—say, if it were doubled to match the living wages that some

U.S. cities have considered—then its impact on reducing the quantity demanded of employment would be far greater. The following Clear It Up feature describes in greater detail some of the arguments for and against changes to minimum wage.

Note:

What's the harm in raising the minimum wage?

Because of the law of demand, a higher required wage will reduce the amount of low-skill employment either in terms of employees or in terms of work hours. Although there is controversy over the numbers, let's say for the sake of the argument that a 10% rise in the minimum wage will reduce the employment of low-skill workers by 2%. Does this outcome mean that raising the minimum wage by 10% is bad public policy? Not necessarily.

If 98% of those receiving the minimum wage have a pay increase of 10%, but 2% of those receiving the minimum wage lose their jobs, are the gains for society as a whole greater than the losses? The answer is not clear, because job losses, even for a small group, may cause more pain than modest income gains for others. For one thing, we need to consider which minimum wage workers are losing their jobs. If the 2% of minimum wage workers who lose their jobs are struggling to support families, that is one thing. If those who lose their job are high school students picking up spending money over summer vacation, that is something else.

Another complexity is that many minimum wage workers do not work full-time for an entire year. Imagine a minimum wage worker who holds different part-time jobs for a few months at a time, with bouts of unemployment in between. The worker in this situation receives the 10% raise in the minimum wage when working, but also ends up working 2% fewer hours during the year because the higher minimum wage reduces how much employers want people to work. Overall, this worker's income would rise because the 10% pay raise would more than offset the 2% fewer hours worked.

Of course, these arguments do not prove that raising the minimum wage is necessarily a good idea either. There may well be other, better public policy options for helping low-wage workers. (The Poverty and Economic

Inequality chapter discusses some possibilities.) The lesson from this maze of minimum wage arguments is that complex social problems rarely have simple answers. Even those who agree on how a proposed economic policy affects quantity demanded and quantity supplied may still disagree on whether the policy is a good idea.

Concepts and Summary

In the labor market, households are on the supply side of the market and firms are on the demand side. In the market for financial capital, households and firms can be on either side of the market: they are suppliers of financial capital when they save or make financial investments, and demanders of financial capital when they borrow or receive financial investments.

In the demand and supply analysis of labor markets, the price can be measured by the annual salary or hourly wage received. The quantity of labor can be measured in various ways, like number of workers or the number of hours worked.

Factors that can shift the demand curve for labor include: a change in the quantity demanded of the product that the labor produces; a change in the production process that uses more or less labor; and a change in government policy that affects the quantity of labor that firms wish to hire at a given wage. Demand can also increase or decrease (shift) in response to: workers' level of education and training, technology, the number of companies, and availability and price of other inputs.

The main factors that can shift the supply curve for labor are: how desirable a job appears to workers relative to the alternatives, government policy that either restricts or encourages the quantity of workers trained for the job, the number of workers in the economy, and required education.

Self-Check Questions

Exercise:

Problem:

In the labor market, what causes a movement along the demand curve? What causes a shift in the demand curve?

Solution:

Changes in the wage rate (the price of labor) cause a movement along the demand curve. A change in anything else that affects demand for labor (e.g., changes in output, changes in the production process that use more or less labor, government regulation) causes a shift in the demand curve.

Exercise:

Problem:

In the labor market, what causes a movement along the supply curve? What causes a shift in the supply curve?

Solution:

Changes in the wage rate (the price of labor) cause a movement along the supply curve. A change in anything else that affects supply of labor (e.g., changes in how desirable the job is perceived to be, government policy to promote training in the field) causes a shift in the supply curve.

Exercise:

Problem:

Why is a living wage considered a price floor? Does imposing a living wage have the same outcome as a minimum wage?

Solution:

Since a living wage is a suggested minimum wage, it acts like a price floor (assuming, of course, that it is followed). If the living wage is binding, it will cause an excess supply of labor at that wage rate.

Review Questions

Exercise:

Problem: What is the “price” commonly called in the labor market?

Exercise:

Problem:

Are households demanders or suppliers in the goods market? Are firms demanders or suppliers in the goods market? What about the labor market and the financial market?

Exercise:

Problem:

Name some factors that can cause a shift in the demand curve in labor markets.

Exercise:

Problem:

Name some factors that can cause a shift in the supply curve in labor markets.

Critical Thinking Questions

Exercise:

Problem:

Other than the demand for labor, what would be another example of a “derived demand?”

Exercise:

Problem:

Suppose that a 5% increase in the minimum wage causes a 5% reduction in employment. How would this affect employers and how would it affect workers? In your opinion, would this be a good policy?

Exercise:

Problem:

What assumption is made for a minimum wage to be a nonbinding price floor? What assumption is made for a living wage price floor to be binding?

Problems

Exercise:

Problem:

Identify each of the following as involving either demand or supply. Draw a circular flow diagram and label the flows A through F. (Some choices can be on both sides of the goods market.)

a. Households in the labor market
b. Firms in the goods market
c. Firms in the financial market
d. Households in the goods market
e. Firms in the labor market
f. Households in the financial market

Exercise:

Problem:

Predict how each of the following events will raise or lower the equilibrium wage and quantity of coal miners in West Virginia. In each case, sketch a demand and supply diagram to illustrate your answer.

a. The price of oil rises.
b. New coal-mining equipment is invented that is cheap and requires few workers to run.
c. Several major companies that do not mine coal open factories in West Virginia, offering a lot of well-paid jobs.
d. Government imposes costly new regulations to make coal-mining a safer job.

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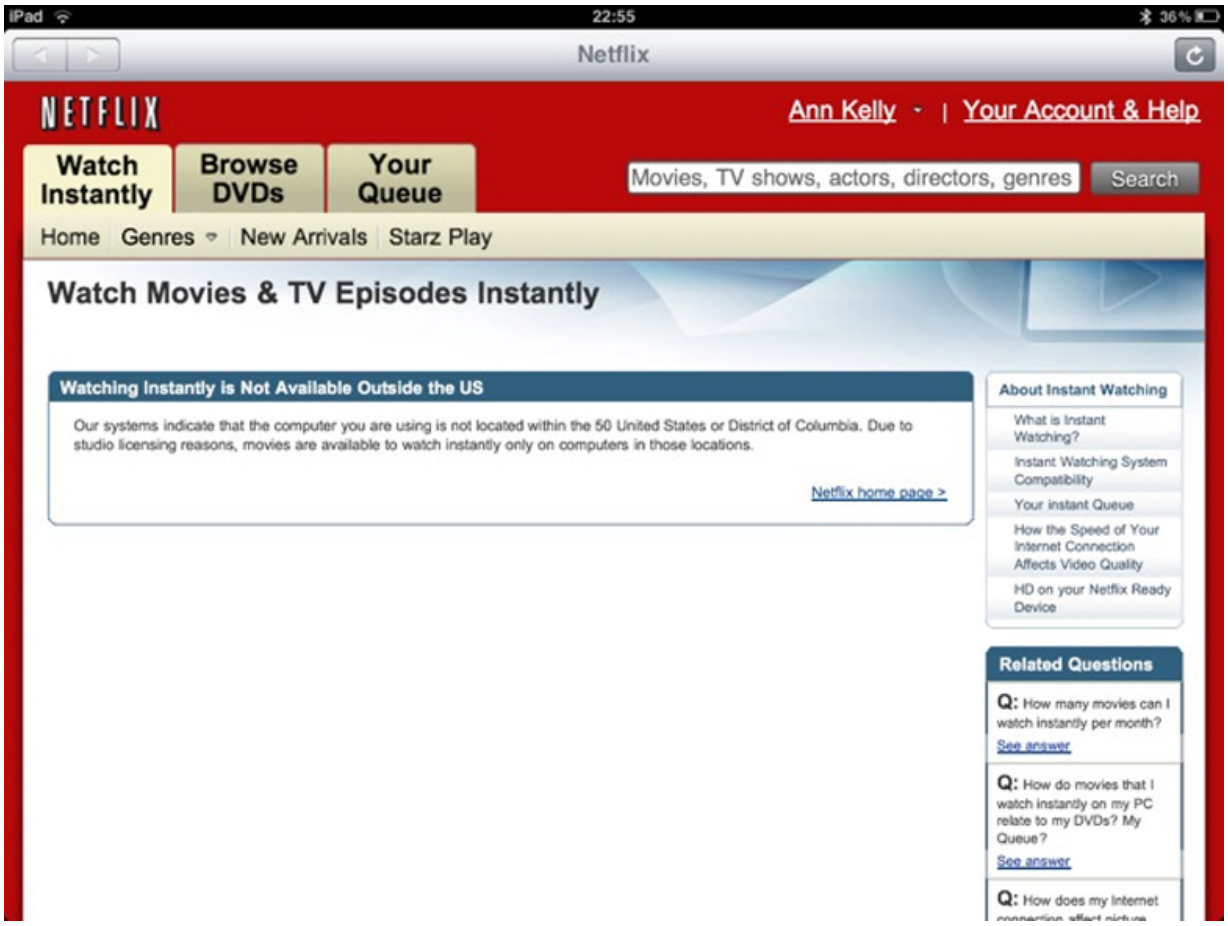
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Glossary

minimum wage
: a price floor that makes it illegal for an employer to pay employees less than a certain hourly rate

Introduction to Elasticity
class="introduction"
Netflix On-Demand Media

Netflix, Inc. is an American provider of on-demand Internet streaming media to many countries around the world, including the United States, and of flat rate DVD-by-mail in the United States. (Credit: modification of work by Traci Lawson/Flickr Creative Commons)



Note:

That Will Be How Much?

Imagine going to your favorite coffee shop and having the waiter inform you the pricing has changed. Instead of $3 for a cup of coffee, you will now be charged $2 for coffee, $1 for creamer, and $1 for your choice of sweetener. If you pay your usual $3 for a cup of coffee, you must choose between creamer and sweetener. If you want both, you now face an extra charge of $1. Sound absurd? Well, that is the situation Netflix customers found themselves in—a 60% price hike to retain the same service in 2011. In early 2011, Netflix consumers paid about $10 a month for a package consisting of streaming video and DVD rentals. In July 2011, the company announced a packaging change. Customers wishing to retain both streaming video and DVD rental would be charged $15.98 per month, a price increase of about 60%. In 2014, Netflix also raised its streaming

video subscription price from $7.99 to $8.99 per month for new U.S. customers. The company also changed its policy of 4K streaming content from $9.00 to $12.00 per month that year.
How would customers of the 18-year-old firm react? Would they abandon Netflix? Would the ease of access to other venues make a difference in how consumers responded to the Netflix price change? The answers to those questions will be explored in this chapter: the change in quantity with respect to a change in price, a concept economists call elasticity.

Note:
Introduction to Elasticity
In this chapter, you will learn about:

- Price Elasticity of Demand and Price Elasticity of Supply
- Polar Cases of Elasticity and Constant Elasticity
- Elasticity and Pricing
- Elasticity in Areas Other Than Price

Anyone who has studied economics knows the law of demand: a higher price will lead to a lower quantity demanded. What you may not know is how much lower the quantity demanded will be. Similarly, the law of supply shows that a higher price will lead to a higher quantity supplied. The question is: How much higher? This chapter will explain how to answer these questions and why they are critically important in the real world.

To find answers to these questions, we need to understand the concept of elasticity. **Elasticity** is an economics concept that measures responsiveness of one variable to changes in another variable. Suppose you drop two items from a second-floor balcony. The first item is a tennis ball. The second item is a brick. Which will bounce higher? Obviously, the tennis ball. We would say that the tennis ball has greater elasticity.

Consider an economic example. Cigarette taxes are an example of a “sin tax,” a tax on something that is bad for you, like alcohol. Cigarettes are taxed at the state and national levels. State taxes range from a low of 17 cents per pack in Missouri to $4.35 per pack in New York. The average state cigarette tax is $1.51 per pack. The 2014 federal tax rate on cigarettes was $1.01 per pack, but in 2015 the Obama Administration proposed raising the federal tax nearly a dollar to $1.95 per pack. The key question is: How much would cigarette purchases decline?

Taxes on cigarettes serve two purposes: to raise tax revenue for government and to discourage consumption of cigarettes. However, if a higher cigarette tax discourages consumption by quite a lot, meaning a greatly reduced quantity of cigarettes is sold, then the cigarette tax on each pack will not raise much revenue for the government. Alternatively, a higher cigarette tax that does not discourage consumption by much will actually raise more tax revenue for the government. Thus, when a government agency tries to calculate the effects of altering its cigarette tax, it must analyze how much the tax affects the quantity of cigarettes consumed. This issue reaches beyond governments and taxes; every firm faces a similar issue. Every time a firm considers raising the price that it charges, it must consider how much a price increase will reduce the quantity demanded of what it sells. Conversely, when a firm puts its products on sale, it must expect (or hope) that the lower price will lead to a significantly higher quantity demanded.

Price Elasticity of Demand and Price Elasticity of Supply
By the end of this section, you will be able to:

- Calculate the price elasticity of demand
- Calculate the price elasticity of supply

Both the demand and supply curve show the relationship between price and the number of units demanded or supplied. **Price elasticity** is the ratio between the percentage change in the quantity demanded (Qd) or supplied (Qs) and the corresponding percent change in price. The **price elasticity of demand** is the percentage change in the quantity *demanded* of a good or service divided by the percentage change in the price. The **price elasticity of supply** is the percentage change in quantity *supplied* divided by the percentage change in price.

Elasticities can be usefully divided into three broad categories: elastic, inelastic, and unitary. An **elastic demand** or **elastic supply** is one in which the elasticity is greater than one, indicating a high responsiveness to changes in price. Elasticities that are less than one indicate low responsiveness to price changes and correspond to **inelastic demand** or **inelastic supply**. **Unitary elasticities** indicate proportional responsiveness of either demand or supply, as summarized in [link].

If . . .	**Then . . .**	**And It Is Called . . .**
$\%$ change in quantity $>$ $\%$ change in price	$\frac{\%\text{ change in quantity}}{\%\text{ change in price}} > 1$	Elastic
$\%$ change in quantity $=$ $\%$ change in price	$\frac{\%\text{ change in quantity}}{\%\text{ change in price}} = 1$	Unitary
$\%$ change in quantity $<$ $\%$ change in price	$\frac{\%\text{ change in quantity}}{\%\text{ change in price}} < 1$	Inelastic

Elastic, Inelastic, and Unitary: Three Cases of Elasticity

Note:
Before we get into the nitty gritty of elasticity, enjoy this article on elasticity and ticket prices at the Super Bowl.

To calculate elasticity, instead of using simple percentage changes in quantity and price, economists use the average percent change in both quantity and price. This is called the Midpoint Method for Elasticity, and is represented in the following equations:
Equation:

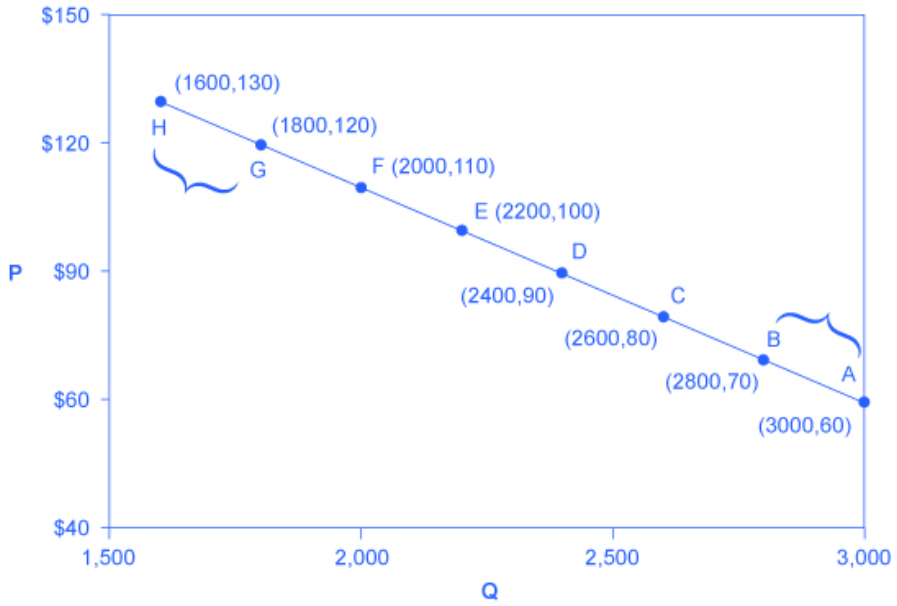
$$\%\text{ change in quantity} = \frac{Q_2 - Q_1}{(Q_2 + Q_1)/2} \times 100$$

$$\%\text{ change in price} = \frac{P_2 - P_1}{(P_2 + P_1)/2} \times 100$$

The advantage of the is Midpoint Method is that one obtains the same elasticity between two price points whether there is a price increase or decrease. This is because the formula uses the same base for both cases.

Calculating Price Elasticity of Demand

Let's calculate the elasticity between points A and B and between points G and H shown in [link].
Calculating the Price Elasticity of Demand



The price elasticity of demand is calculated as the percentage change in quantity divided by the percentage change in price.

First, apply the formula to calculate the elasticity as price decreases from $70 at point B to $60 at point A:

Equation:

$$\begin{aligned}
\%\text{ change in quantity} &= \frac{3{,}000-2{,}800}{(3{,}000+2{,}800)/2} \times 100 \\
&= \frac{200}{2{,}900} \times 100 \\
&= 6.9 \\
\%\text{ change in price} &= \frac{60-70}{(60+70)/2} \times 100 \\
&= \frac{-10}{65} \times 100 \\
&= -15.4 \\
\text{Price Elasticity of Demand} &= \frac{6.9\%}{-15.4\%} \\
&= 0.45
\end{aligned}$$

Therefore, the elasticity of demand between these two points is $\frac{6.9\%}{-15.4\%}$ which is 0.45, an amount smaller than one, showing that the demand is inelastic in this interval. Price elasticities of demand are *always* negative since price and quantity demanded always move in opposite directions (on the demand curve). By convention, we always talk about elasticities as positive numbers. So mathematically, we take the absolute value of the result. We will ignore this detail from now on, while remembering to interpret elasticities as positive numbers.

This means that, along the demand curve between point B and A, if the price changes by 1%, the quantity demanded will change by 0.45%. A change in the price will result in a smaller percentage change in the quantity demanded. For example, a 10% *increase* in the price will result in only a 4.5% *decrease* in quantity demanded. A 10% *decrease* in the price will result in only a 4.5% *increase* in the quantity demanded. Price elasticities of demand are negative numbers indicating that the demand curve is downward sloping, but are read as absolute values. The following Work It Out feature will walk you through calculating the price elasticity of demand.

Note:
Finding the Price Elasticity of Demand
Calculate the price elasticity of demand using the data in [link] for an increase in price from G to H. Has the elasticity increased or decreased?

Step 1. We know that:
Equation:

$$\text{Price Elasticity of Demand} = \frac{\%\text{ change in quantity}}{\%\text{ change in price}}$$

Step 2. From the Midpoint Formula we know that:
Equation:

$$\%\text{ change in quantity} = \frac{Q_2 - Q_1}{(Q_2 + Q_1)/2} \times 100$$
$$\%\text{ change in price} = \frac{P_2 - P_1}{(P_2 + P_1)/2} \times 100$$

Step 3. So we can use the values provided in the figure in each equation:
Equation:

$$\begin{aligned}\%\text{ change in quantity} &= \frac{1{,}600 - 1{,}800}{(1{,}600 + 1{,}800)/2} \times 100 \\ &= \frac{-200}{1{,}700} \times 100 \\ &= -11.76 \\ \%\text{ change in price} &= \frac{130 - 120}{(130 + 120)/2} \times 100 \\ &= \frac{10}{125} \times 100 \\ &= 8.0\end{aligned}$$

Step 4. Then, those values can be used to determine the price elasticity of demand:
Equation:

$$\begin{aligned}\text{Price Elasticity of Demand} &= \frac{\%\text{ change in quantity}}{\%\text{ change in price}} \\ &= \frac{-11.76}{8} \\ &= 1.47\end{aligned}$$

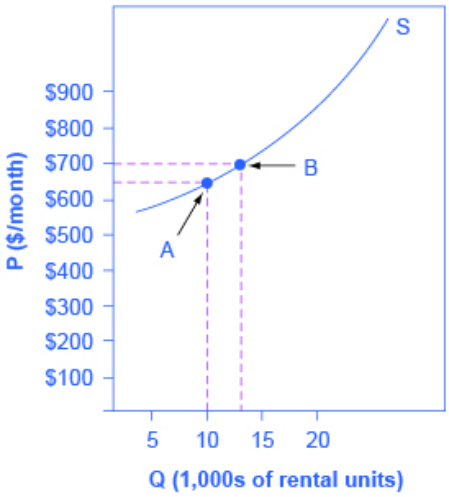
Therefore, the elasticity of demand from G to H 1.47. The magnitude of the elasticity has increased (in absolute value) as we moved up along the demand curve from points A to B. Recall that the elasticity between these two points was 0.45. Demand was inelastic between points A and B and elastic between points G and H. This shows us that price elasticity of demand changes at different points along a straight-line demand curve.

Calculating the Price Elasticity of Supply

Assume that an apartment rents for $650 per month and at that price 10,000 units are rented as shown in [link]. When the price increases to $700 per month, 13,000 units are supplied

into the market. By what percentage does apartment supply increase? What is the price sensitivity?

Price Elasticity of Supply



The price elasticity of supply is calculated as the percentage change in quantity divided by the percentage change in price.

Using the Midpoint Method,

Equation:

$$\begin{aligned}
\%\text{ change in quantity} &= \frac{13{,}000–10{,}000}{(13{,}000+10{,}000)/2} \times 100 \\
&= \frac{3{,}000}{11{,}500} \times 100 \\
&= 26.1 \\
\%\text{ change in price} &= \frac{\$700–\$650}{(\$700+\$650)/2} \times 100 \\
&= \frac{50}{675} \times 100 \\
&= 7.4 \\
\text{Price Elasticity of Supply} &= \frac{26.1\%}{7.4\%} \\
&= 3.53
\end{aligned}$$

Again, as with the elasticity of demand, the elasticity of supply is not followed by any units. Elasticity is a ratio of one percentage change to another percentage change—nothing more—and is read as an absolute value. In this case, a 1% rise in price causes an increase in quantity supplied of 3.5%. The greater than one elasticity of supply means that the percentage change

in quantity supplied will be greater than a one percent price change. If you're starting to wonder if the concept of slope fits into this calculation, read the following Clear It Up box.

Note:
Is the elasticity the slope?
It is a common mistake to confuse the slope of either the supply or demand curve with its elasticity. The slope is the rate of change in units along the curve, or the rise/run (change in y over the change in x). For example, in [link], each point shown on the demand curve, price drops by $10 and the number of units demanded increases by 200. So the slope is –10/200 along the entire demand curve and does not change. The price elasticity, however, changes along the curve. Elasticity between points A and B was 0.45 and increased to 1.47 between points G and H. Elasticity is the *percentage* change, which is a different calculation from the slope and has a different meaning.
When we are at the upper end of a demand curve, where price is high and the quantity demanded is low, a small change in the quantity demanded, even in, say, one unit, is pretty big in percentage terms. A change in price of, say, a dollar, is going to be much less important in percentage terms than it would have been at the bottom of the demand curve. Likewise, at the bottom of the demand curve, that one unit change when the quantity demanded is high will be small as a percentage.
So, at one end of the demand curve, where we have a large percentage change in quantity demanded over a small percentage change in price, the elasticity value would be high, or demand would be relatively elastic. Even with the same change in the price and the same change in the quantity demanded, at the other end of the demand curve the quantity is much higher, and the price is much lower, so the percentage change in quantity demanded is smaller and the percentage change in price is much higher. That means at the bottom of the curve we'd have a small numerator over a large denominator, so the elasticity measure would be much lower, or inelastic.
As we move along the demand curve, the values for quantity and price go up or down, depending on which way we are moving, so the percentages for, say, a $1 difference in price or a one unit difference in quantity, will change as well, which means the ratios of those percentages will change.

Key Concepts and Summary

Price elasticity measures the responsiveness of the quantity demanded or supplied of a good to a change in its price. It is computed as the percentage change in quantity demanded (or supplied) divided by the percentage change in price. Elasticity can be described as elastic (or very responsive), unit elastic, or inelastic (not very responsive). Elastic demand or supply curves indicate that quantity demanded or supplied respond to price changes in a greater than proportional manner. An inelastic demand or supply curve is one where a given percentage change in price will cause a smaller percentage change in quantity demanded or supplied. A

unitary elasticity means that a given percentage change in price leads to an equal percentage change in quantity demanded or supplied.

Self-Check Questions

Exercise:

Problem:

From the data shown in [link] about demand for smart phones, calculate the price elasticity of demand from: point B to point C, point D to point E, and point G to point H. Classify the elasticity at each point as elastic, inelastic, or unit elastic.

Points	P	Q
A	60	3,000
B	70	2,800
C	80	2,600
D	90	2,400
E	100	2,200
F	110	2,000
G	120	1,800
H	130	1,600

Solution:

From point B to point C, price rises from $70 to $80, and Qd decreases from 2,800 to 2,600. So:

Equation:

$$
\begin{aligned}
\%\text{ change in quantity} &= \frac{2600-2800}{(2600+2800)\div 2} \times 100 \\
&= \frac{-200}{2700} \times 100 \\
&= -7.41 \\
\%\text{ change in price} &= \frac{80-70}{(80+70)\div 2} \times 100 \\
&= \frac{10}{75} \times 100 \\
&= 13.33 \\
\text{Elasticity of Demand} &= \frac{-7.41\%}{13.33\%} \\
&= 0.56
\end{aligned}
$$

The demand curve is inelastic in this area; that is, its elasticity value is less than one.

Answer from Point D to point E:
Equation:

$$
\begin{aligned}
\%\text{ change in quantity} &= \frac{2200-2400}{(2200+2400)\div 2} \times 100 \\
&= \frac{-200}{2300} \times 100 \\
&= -8.7 \\
\%\text{ change in price} &= \frac{100-90}{(100+90)\div 2} \times 100 \\
&= \frac{10}{95} \times 100 \\
&= 10.53 \\
\text{Elasticity of Demand} &= \frac{-8.7\%}{10.53\%} \\
&= 0.83
\end{aligned}
$$

The demand curve is inelastic in this area; that is, its elasticity value is less than one.

Answer from Point G to point H:
Equation:

$$
\begin{aligned}
\%\text{ change in quantity} &= \frac{1600-1800}{1700} \times 100 \\
&= \frac{-200}{1700} \times 100 \\
&= -11.76 \\
\%\text{ change in price} &= \frac{130-120}{125} \times 100 \\
&= \frac{10}{125} \times 100 \\
&= 8.00 \\
\text{Elasticity of Demand} &= \frac{-11.76\%}{8.00\%} \\
&= -1.47
\end{aligned}
$$

The demand curve is elastic in this interval.

Exercise:

Problem:

From the data shown in [link] about supply of alarm clocks, calculate the price elasticity of supply from: point J to point K, point L to point M, and point N to point P. Classify the elasticity at each point as elastic, inelastic, or unit elastic.

Point	Price	Quantity Supplied
J	$8	50
K	$9	70
L	$10	80
M	$11	88
N	$12	95
P	$13	100

Solution:

From point J to point K, price rises from $8 to $9, and quantity rises from 50 to 70. So:
Equation:

$$
\begin{aligned}
\%\text{ change in quantity} &= \frac{70-50}{(70+50)\div 2} \times 100 \\
&= \frac{20}{60} \times 100 \\
&= 33.33 \\
\%\text{ change in price} &= \frac{\$9-\$8}{(\$9+\$8)\div 2} \times 100 \\
&= \frac{1}{\text{mtd}} \times 100 \\
&= 11.76 \\
\text{Elasticity of Supply} &= \frac{33.33\%}{11.76\%} \\
&= 2.83
\end{aligned}
$$

The supply curve is elastic in this area; that is, its elasticity value is greater than one.

From point L to point M, the price rises from $10 to $11, while the Qs rises from 80 to 88:
Equation:

$$
\begin{aligned}
\%\text{ change in quantity} &= \frac{88-80}{(88+80)\div 2} \times 100 \\
&= \frac{8}{84} \times 100 \\
&= 9.52 \\
\%\text{change in price} &= \frac{\$11-\$10}{(\$11+\$10)\div 2} \times 100 \\
&= \frac{1}{10.5} \times 100 \\
&= 9.52 \\
\text{Elasticity of Demand} &= \frac{9.52\%}{9.52\%} \\
&= 1.0
\end{aligned}
$$

The supply curve has unitary elasticity in this area.

From point N to point P, the price rises from $12 to $13, and Qs rises from 95 to 100:
Equation:

$$
\begin{aligned}
\%\text{ change in quantity} &= \frac{100-95}{(100+95)\div 2} \times 100 \\
&= \frac{5}{97.5} \times 100 \\
&= 5.13 \\
\%\text{ change in price} &= \frac{\$13-\$12}{(\$13+\$12)\div 2} \times 100 \\
&= \frac{1}{12.5} \times 100 \\
&= 8.0 \\
\text{Elasticity of Supply} &= \frac{5.13\%}{8.0\%} \\
&= 0.64
\end{aligned}
$$

The supply curve is inelastic in this region of the supply curve.

Review Questions

Exercise:

Problem: What is the formula for calculating elasticity?

Exercise:

Problem:

What is the price elasticity of demand? Can you explain it in your own words?

Exercise:

Problem: What is the price elasticity of supply? Can you explain it in your own words?

Critical Thinking Questions

Exercise:

Problem:

Transatlantic air travel in business class has an estimated elasticity of demand of 0.40 less than transatlantic air travel in economy class, with an estimated price elasticity of 0.62. Why do you think this is the case?

Exercise:

Problem:

What is the relationship between price elasticity and position on the demand curve? For example, as you move up the demand curve to higher prices and lower quantities, what happens to the measured elasticity? How would you explain that?

Problems

Exercise:

Problem:

The equation for a demand curve is P = 48 – 3Q. What is the elasticity in moving from a quantity of 5 to a quantity of 6?

Exercise:

Problem:

The equation for a demand curve is P = 2/Q. What is the elasticity of demand as price falls from 5 to 4? What is the elasticity of demand as the price falls from 9 to 8? Would you expect these answers to be the same?

Exercise:

Problem:

The equation for a supply curve is 4P = Q. What is the elasticity of supply as price rises from 3 to 4? What is the elasticity of supply as the price rises from 7 to 8? Would you expect these answers to be the same?

Exercise:

Problem:

The equation for a supply curve is P = 3Q – 8. What is the elasticity in moving from a price of 4 to a price of 7?

Glossary

elastic demand
: when the elasticity of demand is greater than one, indicating a high responsiveness of quantity demanded or supplied to changes in price

elastic supply
: when the elasticity of either supply is greater than one, indicating a high responsiveness of quantity demanded or supplied to changes in price

elasticity
: an economics concept that measures responsiveness of one variable to changes in another variable

inelastic demand
: when the elasticity of demand is less than one, indicating that a 1 percent increase in price paid by the consumer leads to less than a 1 percent change in purchases (and vice versa); this indicates a low responsiveness by consumers to price changes

inelastic supply
: when the elasticity of supply is less than one, indicating that a 1 percent increase in price paid to the firm will result in a less than 1 percent increase in production by the firm; this indicates a low responsiveness of the firm to price increases (and vice versa if prices drop)

price elasticity
: the relationship between the percent change in price resulting in a corresponding percentage change in the quantity demanded or supplied

price elasticity of demand
: percentage change in the quantity *demanded* of a good or service divided the percentage change in price

price elasticity of supply
: percentage change in the quantity *supplied* divided by the percentage change in price

unitary elasticity
: when the calculated elasticity is equal to one indicating that a change in the price of the good or service results in a proportional change in the quantity demanded or supplied

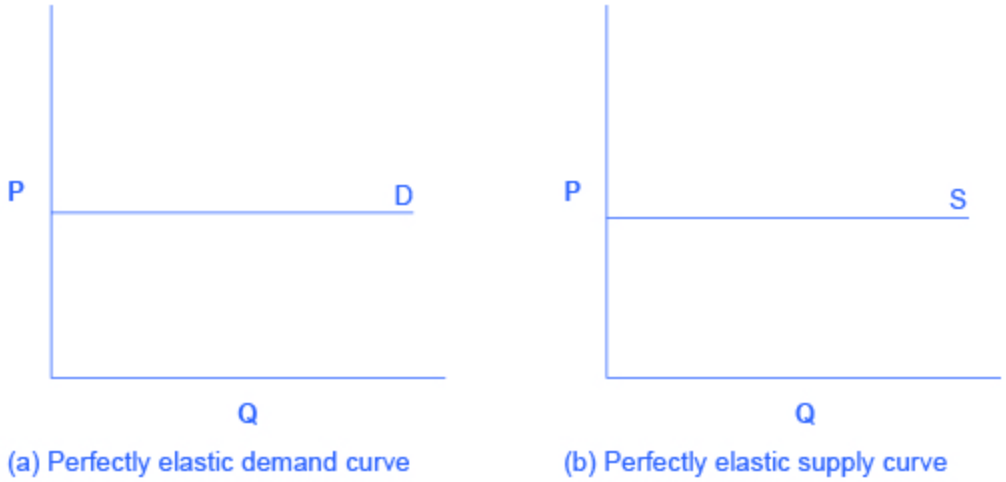
Polar Cases of Elasticity and Constant Elasticity

By the end of this section, you will be able to:

- Differentiate between infinite and zero elasticity
- Analyze graphs in order to classify elasticity as constant unitary, infinite, or zero

There are two extreme cases of elasticity: when elasticity equals zero and when it is infinite. A third case is that of constant unitary elasticity. We will describe each case. **Infinite elasticity** or **perfect elasticity** refers to the extreme case where either the quantity demanded (Qd) or supplied (Qs) changes by an infinite amount in response to any change in price at all. In both cases, the supply and the demand curve are horizontal as shown in [link]. While perfectly elastic supply curves are unrealistic, goods with readily available inputs and whose production can be easily expanded will feature highly elastic supply curves. Examples include pizza, bread, books and pencils. Similarly, perfectly elastic demand is an extreme example. But luxury goods, goods that take a large share of individuals' income, and goods with many substitutes are likely to have highly elastic demand curves. Examples of such goods are Caribbean cruises and sports vehicles.

Infinite Elasticity

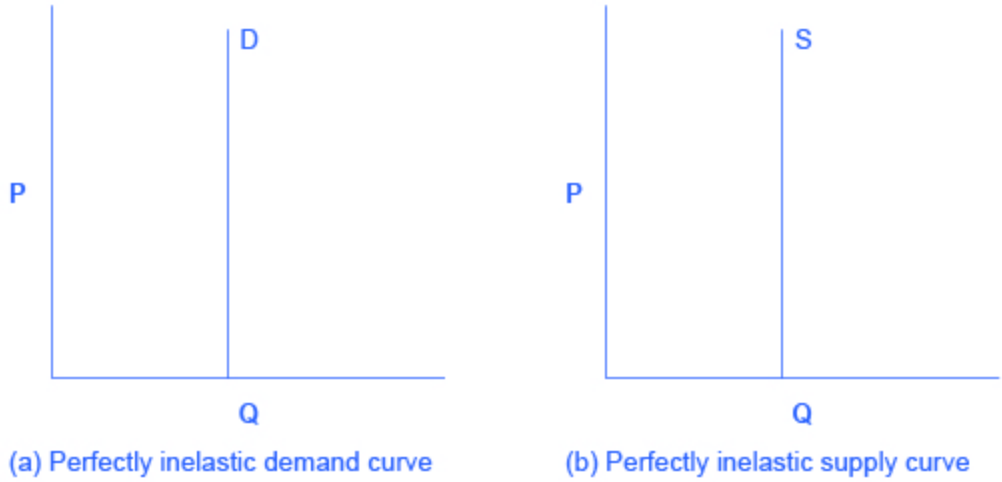


The horizontal lines show that an infinite quantity will be demanded or supplied at a specific price. This illustrates the cases of a perfectly (or infinitely) elastic demand curve and supply curve.

The quantity supplied or demanded is extremely responsive to price changes, moving from zero for prices close to P to infinite when price reach P.

Zero elasticity or **perfect inelasticity**, as depicted in [link] refers to the extreme case in which a percentage change in price, no matter how large, results in zero change in quantity. While a perfectly inelastic supply is an extreme example, goods with limited supply of inputs are likely to feature highly inelastic supply curves. Examples include diamond rings or housing in prime locations such as apartments facing Central Park in New York City. Similarly, while perfectly inelastic demand is an extreme case, necessities with no close substitutes are likely to have highly inelastic demand curves. This is the case of life-saving drugs and gasoline.

Zero Elasticity

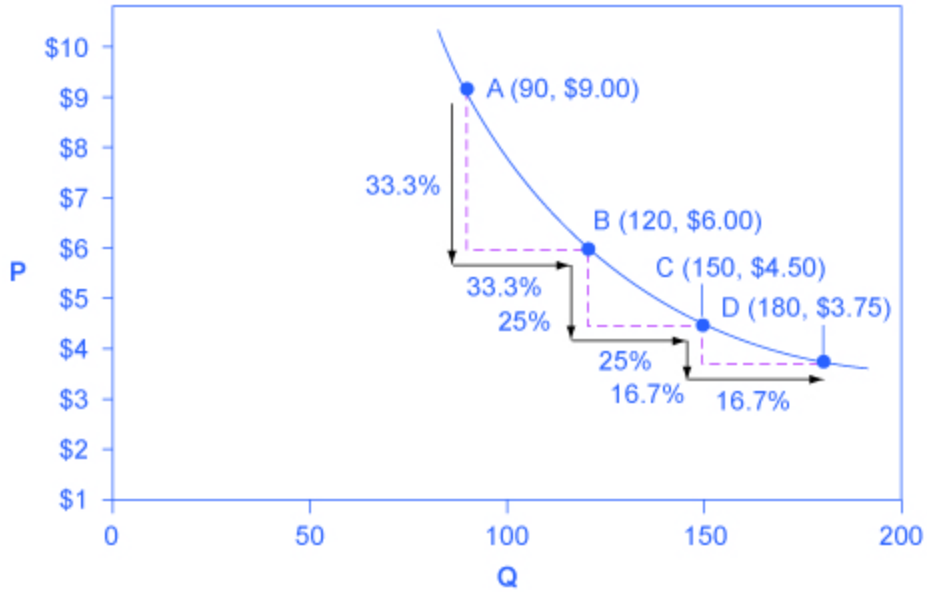


The vertical supply curve and vertical demand curve show that there will be zero percentage change in quantity (a) demanded or (b) supplied, regardless of the price.

Constant unitary elasticity, in either a supply or demand curve, occurs when a price change of one percent results in a quantity change of one percent. [link] shows a demand curve with constant unit elasticity. As we move

down the demand curve from A to B, the price falls by 33% and quantity demanded rises by 33%; as you move from B to C, the price falls by 25% and the quantity demanded rises by 25%; as you move from C to D, the price falls by 16% and the quantity rises by 16%. Notice that in absolute value, the declines in price, as you step down the demand curve, are not identical. Instead, the price falls by $3 from A to B, by a smaller amount of $1.50 from B to C, and by a still smaller amount of $0.75 from C to D. As a result, a demand curve with constant unitary elasticity moves from a steeper slope on the left and a flatter slope on the right—and a curved shape overall.

A Constant Unitary Elasticity Demand Curve



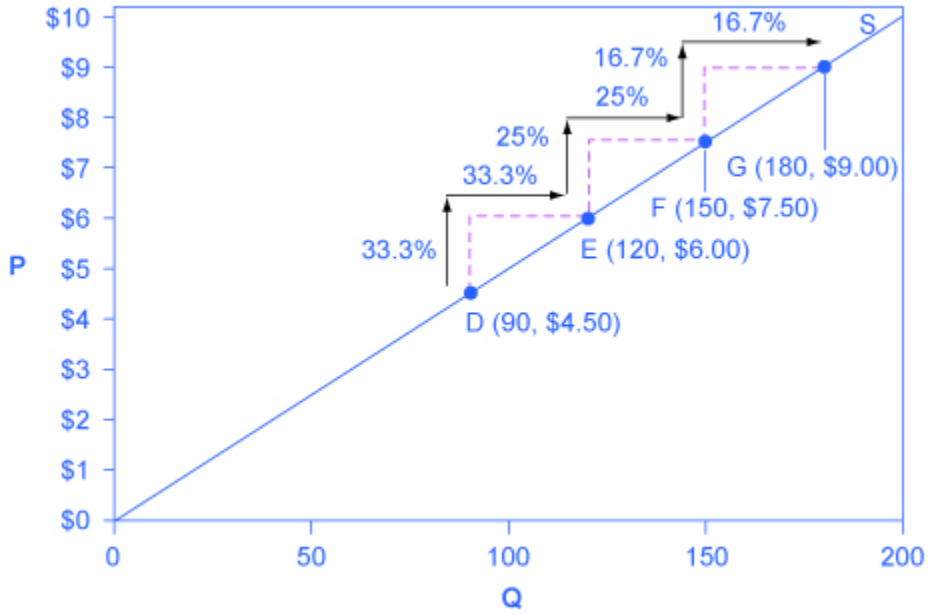
A demand curve with constant unitary elasticity will be a curved line. Notice how price and quantity demanded change by an identical amount in each step down the demand curve.

Unlike the demand curve with unitary elasticity, the supply curve with unitary elasticity is represented by a straight line. In moving up the supply curve from left to right, each increase in quantity of 30, from 90 to 120 to 150 to 180, is equal in absolute value. However, in percentage value, the steps are decreasing, from 33.3% to 25% to 16.7%, because the original

quantity points in each percentage calculation are getting larger and larger, which expands the denominator in the elasticity calculation.

Consider the price changes moving up the supply curve in [link]. From points D to E to F and to G on the supply curve, each step of $1.50 is the same in absolute value. However, if the price changes are measured in percentage change terms, they are also decreasing, from 33.3% to 25% to 16.7%, because the original price points in each percentage calculation are getting larger and larger in value. Along the constant unitary elasticity supply curve, the percentage quantity increases on the horizontal axis exactly match the percentage price increases on the vertical axis—so this supply curve has a constant unitary elasticity at all points.

A Constant Unitary Elasticity Supply Curve



A constant unitary elasticity supply curve is a straight line reaching up from the origin. Between each point, the percentage increase in quantity supplied is the same as the percentage increase in price.

Key Concepts and Summary

Infinite or perfect elasticity refers to the extreme case where either the quantity demanded or supplied changes by an infinite amount in response to any change in price at all. Zero elasticity refers to the extreme case in which a percentage change in price, no matter how large, results in zero change in quantity. Constant unitary elasticity in either a supply or demand curve refers to a situation where a price change of one percent results in a quantity change of one percent.

Self-Check Questions

Exercise:

Problem:

Why is the demand curve with constant unitary elasticity concave?

Solution:

The demand curve with constant unitary elasticity is concave because at high prices, a one percent decrease in price results in more than a one percent increase in quantity. As we move down the demand curve, price drops and the one percent decrease in price causes less than a one percent increase in quantity.

Exercise:

Problem:

Why is the supply curve with constant unitary elasticity a straight line?

Solution:

The constant unitary elasticity is a straight line because the curve slopes upward and both price and quantity are increasing proportionally.

Review Questions

Exercise:

Problem:

Describe the general appearance of a demand or a supply curve with zero elasticity.

Exercise:

Problem:

Describe the general appearance of a demand or a supply curve with infinite elasticity.

Critical Thinking Question

Exercise:

Problem:

Can you think of an industry (or product) with near infinite elasticity of supply in the short term? That is, what is an industry that could increase Qs almost without limit in response to an increase in the price?

Problems

Exercise:

Problem:

The supply of paintings by Leonardo Da Vinci, who painted the *Mona Lisa* and *The Last Supper* and died in 1519, is highly inelastic. Sketch a supply and demand diagram, paying attention to the appropriate elasticities, to illustrate that demand for these paintings will determine the price.

Exercise:

Problem:

Say that a certain stadium for professional football has 70,000 seats. What is the shape of the supply curve for tickets to football games at that stadium? Explain.

Exercise:

Problem:

When someone's kidneys fail, the person needs to have medical treatment with a dialysis machine (unless or until they receive a kidney transplant) or they will die. Sketch a supply and demand diagram, paying attention to the appropriate elasticities, to illustrate that the supply of such dialysis machines will primarily determine the price.

Glossary

constant unitary elasticity
: when a given percent price change in price leads to an equal percentage change in quantity demanded or supplied

infinite elasticity
: the extremely elastic situation of demand or supply where quantity changes by an infinite amount in response to any change in price; horizontal in appearance

perfect elasticity
: see infinite elasticity

zero inelasticity
: the highly inelastic case of demand or supply in which a percentage change in price, no matter how large, results in zero change in the quantity; vertical in appearance

perfect inelasticity
: see zero elasticity

Introduction to the Macroeconomic Perspective
class="introduction"
The Great Depression

At times, such as when many people are in need of government assistance, it is easy to tell how the economy is doing. This photograph shows people lined up during the Great Depression, waiting for relief checks. At other times, when some are doing well and others are not, it is more difficult to ascertain how the economy of a country is doing. (Credit: modification of work by the U.S. Library of Congress/Wikimedia Commons)



Note:

How is the Economy Doing? How Does One Tell?

The 1990s were boom years for the U.S. economy. The late 2000s, from 2007 to 2014 were not. What causes the economy to expand or contract? Why do businesses fail when they are making all the right decisions? Why do workers lose their jobs when they are hardworking and productive? Are bad economic times a failure of the market system? Are they a failure of the government? These are all questions of macroeconomics, which we will begin to address in this chapter. We will not be able to answer all of these questions here, but we will start with the basics: How is the economy doing? How can we tell?

The macro economy includes all buying and selling, all production and consumption; everything that goes on in every market in the economy. How can we get a handle on that? The answer begins more than 80 years ago, during the Great Depression. President Franklin D. Roosevelt and his economic advisers knew things were bad—but how could they express and measure just how bad it was? An economist named Simon Kuznets, who later won the Nobel Prize for his work, came up with a way to track what the entire economy is producing. The result—gross domestic product

(GDP)—remains our basic measure of macroeconomic activity. In this chapter, you will learn how GDP is constructed, how it is used, and why it is so important.

Note:
Introduction to the Macroeconomic Perspective
In this chapter, you will learn about:

- Measuring the Size of the Economy: Gross Domestic Product
- Adjusting Nominal Values to Real Values
- Tracking Real GDP over Time
- Comparing GDP among Countries
- How Well GDP Measures the Well-Being of Society

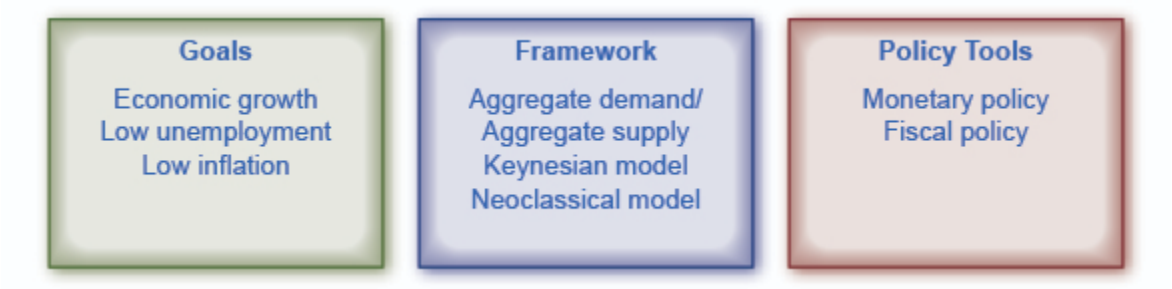
Macroeconomics focuses on the economy as a whole (or on whole economies as they interact). What causes recessions? What makes unemployment stay high when recessions are supposed to be over? Why do some countries grow faster than others? Why do some countries have higher standards of living than others? These are all questions that macroeconomics addresses. Macroeconomics involves adding up the economic activity of all households and all businesses in all markets to get the overall demand and supply in the economy. However, when we do that, something curious happens. It is not unusual that what results at the macro level is different from the sum of the microeconomic parts. Indeed, what seems sensible from a microeconomic point of view can have unexpected or counterproductive results at the macroeconomic level. Imagine that you are sitting at an event with a large audience, like a live concert or a basketball game. A few people decide that they want a better view, and so they stand up. However, when these people stand up, they block the view for other people, and the others need to stand up as well if they wish to see. Eventually, nearly everyone is standing up, and as a result, no one can see much better than before. The rational decision of some individuals at the

micro level—to stand up for a better view—ended up being self-defeating at the macro level. This is not macroeconomics, but it is an apt analogy.

Macroeconomics is a rather massive subject. How are we going to tackle it? [link] illustrates the structure we will use. We will study macroeconomics from three different perspectives:

1. What are the macroeconomic goals? (Macroeconomics as a discipline does not have goals, but we do have goals for the macro economy.)
2. What are the frameworks economists can use to analyze the macroeconomy?
3. Finally, what are the policy tools governments can use to manage the macroeconomy?

Macroeconomic Goals, Framework, and Policies



This chart shows what macroeconomics is about. The box on the left indicates a consensus of what are the most important goals for the macro economy, the middle box lists the frameworks economists use to analyze macroeconomic changes (such as inflation or recession), and the box on the right indicates the two tools the federal government uses to influence the macro economy.

Goals

In thinking about the overall health of the macroeconomy, it is useful to consider three primary goals: economic growth, low unemployment, and low inflation.

- Economic growth ultimately determines the prevailing standard of living in a country. Economic growth is measured by the percentage change in real (inflation-adjusted) gross domestic product. A growth rate of more than 3% is considered good.
- Unemployment, as measured by the unemployment rate, is the percentage of people in the labor force who do not have a job. When people lack jobs, the economy is wasting a precious resource-labor, and the result is lower goods and services produced. Unemployment, however, is more than a statistic—it represents people's livelihoods. While measured unemployment is unlikely to ever be zero, a measured unemployment rate of 5% or less is considered low (good).
- Inflation is a sustained increase in the overall level of prices, and is measured by the consumer price index. If many people face a situation where the prices that they pay for food, shelter, and healthcare are rising much faster than the wages they receive for their labor, there will be widespread unhappiness as their standard of living declines. For that reason, low inflation—an inflation rate of 1–2%—is a major goal.

Frameworks

As you learn in the micro part of this book, principal tools used by economists are theories and models (see Welcome to Economics! for more on this). In microeconomics, we used the theories of supply and demand; in macroeconomics, we use the theories of aggregate demand (AD) and aggregate supply (AS). This book presents two perspectives on macroeconomics: the Neoclassical perspective and the Keynesian perspective, each of which has its own version of AD and AS. Between the two perspectives, you will obtain a good understanding of what drives the macroeconomy.

Policy Tools

National governments have two tools for influencing the macroeconomy. The first is monetary policy, which involves managing the money supply

and interest rates. The second is fiscal policy, which involves changes in government spending/purchases and taxes.

Each of the items in [link] will be explained in detail in one or more other chapters. As you learn these things, you will discover that the goals and the policy tools are in the news almost every day.

Measuring the Size of the Economy: Gross Domestic Product

By the end of this section, you will be able to:

- Identify the components of GDP on the demand side and on the supply side
- Evaluate how gross domestic product (GDP) is measured
- Contrast and calculate GDP, net exports, and net national product

Macroeconomics is an empirical subject, so the first step toward understanding it is to measure the economy.

How large is the U.S. economy? The size of a nation's overall economy is typically measured by its **gross domestic product (GDP)**, which is the value of all final goods and services produced within a country in a given year. The measurement of GDP involves counting up the production of millions of different goods and services—smart phones, cars, music downloads, computers, steel, bananas, college educations, and all other new goods and services produced in the current year—and summing them into a total dollar value. This task is straightforward: take the quantity of everything produced, multiply it by the price at which each product sold, and add up the total. In 2014, the U.S. GDP totaled $17.4 trillion, the largest GDP in the world.

Each of the market transactions that enter into GDP must involve both a buyer and a seller. The GDP of an economy can be measured either by the total dollar value of what is purchased in the economy, or by the total dollar value of what is produced. There is even a third way, as we will explain later.

GDP Measured by Components of Demand

Who buys all of this production? This demand can be divided into four main parts: consumer spending (consumption), business spending (investment), government spending on goods and services, and spending on net exports. (See the following Clear It Up feature to understand what is meant by investment.) [link] shows how these four components added up to the GDP in 2014. [link] (a) shows the levels of consumption, investment, and government purchases over time, expressed as a percentage of GDP, while [link] (b) shows the levels of exports and imports as a percentage of GDP over time. A few patterns about each of these components are worth noticing. [link] shows the components of GDP from the demand side.

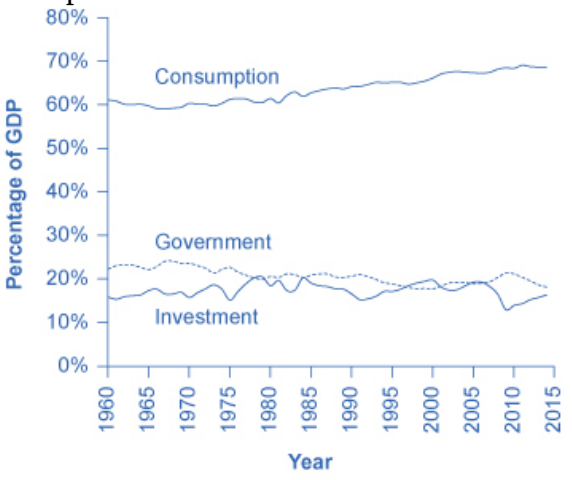
	Components of GDP on the Demand Side (in trillions of dollars)	**Percentage of Total**
Consumption	$11.9	68.4%

	Components of GDP on the Demand Side (in trillions of dollars)	Percentage of Total
Investment	$2.9	16.7%
Government	$3.2	18.4%
Exports	$2.3	13.2%
Imports	–$2.9	–16.7%
Total GDP	**$17.4**	**100%**

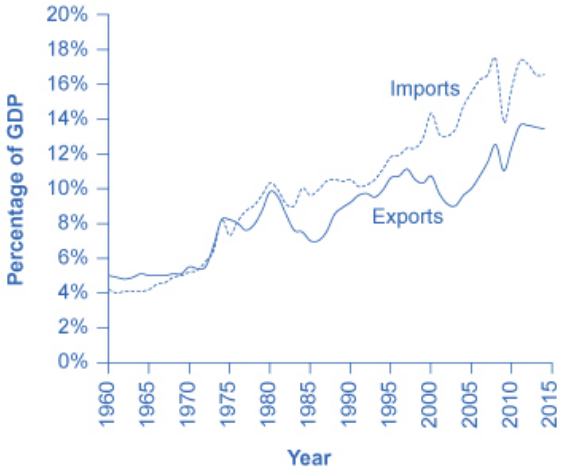
Components of U.S. GDP in 2014: From the Demand Side(Source: http://bea.gov/iTable/index_nipa.cfm)

Note:
What is meant by the word “investment”?
What do economists mean by investment, or business spending? In calculating GDP, investment does not refer to the purchase of stocks and bonds or the trading of financial assets. It refers to the purchase of new capital goods, that is, new commercial real estate (such as buildings, factories, and stores) and equipment, residential housing construction, and inventories. Inventories that are produced this year are included in this year’s GDP—even if they have not yet sold. From the accountant’s perspective, it is as if the firm invested in its own inventories. Business investment in 2014 was almost $3 trillion, according to the Bureau of Economic Analysis.

Components of GDP on the Demand Side



(a) Demand from consumption, investment, and government



(b) Imports and exports

(a) Consumption is about two-thirds of GDP, but it moves relatively little over time. Business investment hovers around 15% of GDP, but it increases and declines more than consumption. Government spending on goods and services is around 20% of GDP. (b) Exports are added to total demand for goods and services, while imports are subtracted from total demand. If exports exceed imports, as in most of the 1960s and 1970s in the U.S. economy, a trade surplus exists. If imports exceed exports, as in recent years, then a trade deficit exists. (Source: http://bea.gov/iTable/index_nipa.cfm)

Consumption expenditure by households is the largest component of GDP, accounting for about two-thirds of the GDP in any year. This tells us that consumers' spending decisions are a major driver of the economy. However, consumer spending is a gentle elephant: when viewed over time, it does not jump around too much.

Investment expenditure refers to purchases of physical plant and equipment, primarily by businesses. If Starbucks builds a new store, or Amazon buys robots, these expenditures are counted under business investment. Investment demand is far smaller than consumption demand, typically accounting for only about 15–18% of GDP, but it is very important for the economy because this is where jobs are created. However, it fluctuates more noticeably than consumption. Business investment is volatile; new technology or a new product can spur business investment, but then confidence can drop and business investment can pull back sharply.

If you have noticed any of the infrastructure projects (new bridges, highways, airports) launched during the recession of 2009, you have seen how important government spending can be for the economy. Government expenditure in the United States is about 20% of GDP, and includes spending by all three levels of government: federal, state, and local. The only part of government spending counted in demand is government purchases of goods or services produced in the economy. Examples include the government buying a new fighter jet for the Air Force (federal government spending), building a new highway (state government spending), or a new school (local government spending). A significant portion of government budgets are transfer payments, like unemployment benefits, veteran's benefits, and Social Security payments to retirees. These payments are excluded from GDP because the government does not receive a new good or service in return or exchange. Instead they are transfers of income from taxpayers to others. If you are curious about the awesome undertaking of adding up GDP, read the following Clear It Up feature.

Note:
How do statisticians measure GDP?
Government economists at the Bureau of Economic Analysis (BEA), within the U.S. Department of Commerce, piece together estimates of GDP from a variety of sources. Once every five years, in the second and seventh year of each decade, the Bureau of the Census carries out a detailed census of businesses throughout the United States. In between,

the Census Bureau carries out a monthly survey of retail sales. These figures are adjusted with foreign trade data to account for exports that are produced in the United States and sold abroad and for imports that are produced abroad and sold here. Once every ten years, the Census Bureau conducts a comprehensive survey of housing and residential finance. Together, these sources provide the main basis for figuring out what is produced for consumers.

For investment, the Census Bureau carries out a monthly survey of construction and an annual survey of expenditures on physical capital equipment.

For what is purchased by the federal government, the statisticians rely on the U.S. Department of the Treasury. An annual Census of Governments gathers information on state and local governments. Because a lot of government spending at all levels involves hiring people to provide services, a large portion of government spending is also tracked through payroll records collected by state governments and by the Social Security Administration.

With regard to foreign trade, the Census Bureau compiles a monthly record of all import and export documents. Additional surveys cover transportation and travel, and adjustment is made for financial services that are produced in the United States for foreign customers.

Many other sources contribute to the estimates of GDP. Information on energy comes from the U.S. Department of Transportation and Department of Energy. Information on healthcare is collected by the Agency for Health Care Research and Quality. Surveys of landlords find out about rental income. The Department of Agriculture collects statistics on farming.

All of these bits and pieces of information arrive in different forms, at different time intervals. The BEA melds them together to produce estimates of GDP on a quarterly basis (every three months). These numbers are then “annualized” by multiplying by four. As more information comes in, these estimates are updated and revised. The “advance” estimate of GDP for a certain quarter is released one month after a quarter. The “preliminary” estimate comes out one month after that. The “final” estimate is published one month later, but it is not actually final. In July, roughly updated estimates for the previous calendar year are released. Then, once every five years, after the results of the latest detailed five-year business census have been processed, the BEA revises all of the past estimates of GDP according to the newest methods and data, going all the way back to 1929.

Note:

Visit this website to read FAQs on the BEA site. You can even email your own questions!



When thinking about the demand for domestically produced goods in a global economy, it is important to count spending on exports—domestically produced goods that are sold abroad. By the same token, we must also subtract spending on imports—goods produced in other countries that are purchased by residents of this country. The net export component of GDP is equal to the dollar value of exports (X) minus the dollar value of imports (M), (X – M). The gap between exports and imports is called the **trade balance**. If a country's exports are larger than its imports, then a country is said to have a **trade surplus**. In the United States, exports typically exceeded imports in the 1960s and 1970s, as shown in [link] (b).

Since the early 1980s, imports have typically exceeded exports, and so the United States has experienced a **trade deficit** in most years. Indeed, the trade deficit grew quite large in the late 1990s and in the mid-2000s. [link] (b) also shows that imports and exports have both risen substantially in recent decades, even after the declines during the Great Recession between 2008 and 2009. As noted before, if exports and imports are equal, foreign trade has no effect on total GDP. However, even if exports and imports are balanced overall, foreign trade might still have powerful effects on particular industries and workers by causing nations to shift workers and physical capital investment toward one industry rather than another.

Based on these four components of demand, GDP can be measured as:
Equation:

$$\text{GDP} = \text{Consumption} + \text{Investment} + \text{Government} + \text{Trade balance}$$
$$\text{GDP} = \text{C} + \text{I} + \text{G} + (\text{X} - \text{M})$$

Understanding how to measure GDP is important for analyzing connections in the macro economy and for thinking about macroeconomic policy tools.

GDP Measured by What is Produced

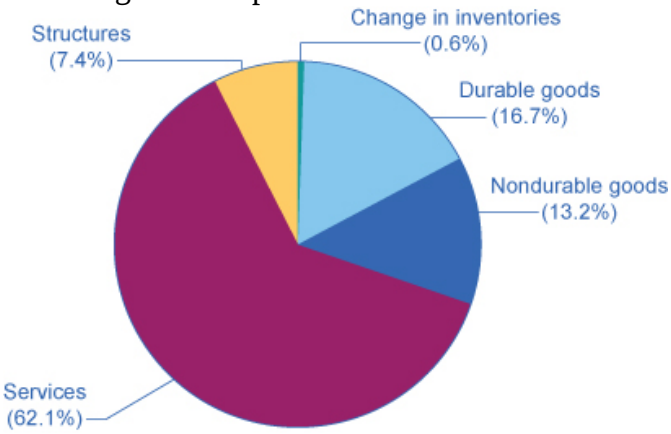
Everything that is purchased must be produced first. [link] breaks down what is produced into five categories: **durable goods**, **nondurable goods**, **services**, **structures**, and the change in **inventories**. Before going into detail about these categories, notice that total GDP measured according to what is produced is exactly the same as the GDP measured by looking at the five components of demand. [link] provides a visual representation of this information.

	Components of GDP on the Supply Side (in trillions of dollars)	**Percentage of Total**
Goods		

	Components of GDP on the Supply Side (in trillions of dollars)	Percentage of Total
Durable goods	$2.9	16.7%
Nondurable goods	$2.3	13.2%
Services	$10.8	62.1%
Structures	$1.3	7.4%
Change in inventories	$0.1	0.6%
Total GDP	**$17.4**	**100%**

Components of U.S. GDP on the Production Side, 2014(Source: http://bea.gov/iTable/index_nipa.cfm)

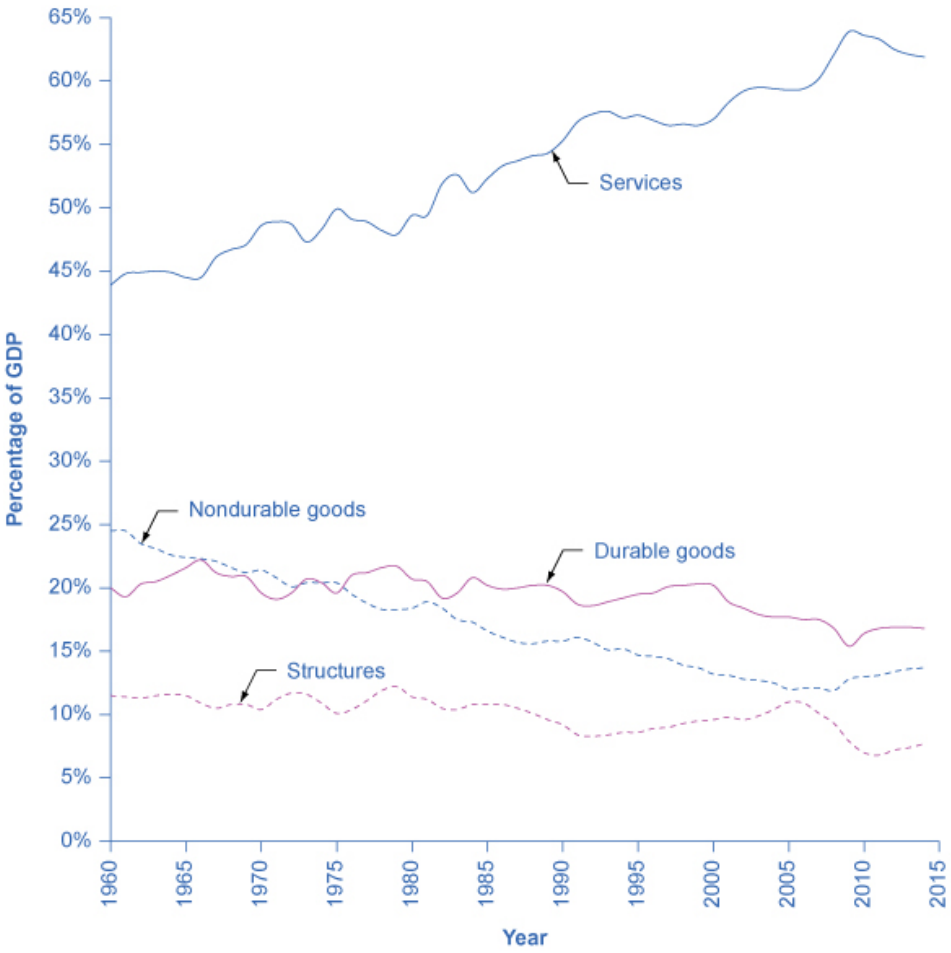
Percentage of Components of GDP on the Production Side



Services make up over half of the production side components of GDP in the United States.

Since every market transaction must have both a buyer and a seller, GDP must be the same whether measured by what is demanded or by what is produced. [link] shows these components of what is produced, expressed as a percentage of GDP, since 1960.

Types of Production



Services are the largest single component of total supply, representing over half of GDP. Nondurable goods used to be larger than durable goods, but in recent years, nondurable goods have been dropping closer to durable goods, which is about 20% of GDP. Structures hover around 10% of GDP. The change in inventories, the final component of aggregate supply, is not shown here; it is typically less than 1% of GDP.

In thinking about what is produced in the economy, many non-economists immediately focus on solid, long-lasting goods, like cars and computers. By far the largest part of GDP, however, is services. Moreover, services have been a growing share of GDP over time. A detailed breakdown of the leading service industries would include healthcare, education, and legal and financial services. It has been decades since most of the U.S. economy involved making solid objects. Instead, the most common jobs in a modern economy involve a worker looking at pieces of paper or a computer screen; meeting with co-workers, customers, or suppliers; or making phone calls.

Even within the overall category of goods, long-lasting durable goods like cars and refrigerators are about the same share of the economy as short-lived nondurable goods like food and clothing. The category of structures includes everything from homes, to office buildings, shopping malls, and factories. Inventories is a small category that refers to the goods that have been produced by one business but have not yet been sold to consumers, and are still sitting in warehouses and on shelves. The amount of inventories sitting on shelves tends to decline if business is better than expected, or to rise if business is worse than expected.

The Problem of Double Counting

GDP is defined as the current value of all final goods and services produced in a nation in a year. What are final goods? They are goods at the furthest stage of production at the end of a year. Statisticians who calculate GDP must avoid the mistake of **double counting**, in which output is counted more than once as it travels through the stages of production. For example, imagine what would happen if government statisticians first counted the value of tires produced by a tire manufacturer, and then counted the value of a new truck sold by an automaker that contains those tires. In this example, the value of the tires would have been counted twice-because the price of the truck includes the value of the tires.

To avoid this problem, which would overstate the size of the economy considerably, government statisticians count just the value of **final goods and services** in the chain of production that are sold for consumption, investment, government, and trade purposes. **Intermediate goods**, which are goods that go into the production of other goods, are excluded from GDP calculations. From the example above, only the value of the Ford truck will be counted. The value of what businesses provide to other businesses is captured in the final products at the end of the production chain.

The concept of GDP is fairly straightforward: it is just the dollar value of all final goods and services produced in the economy in a year. In our decentralized, market-oriented economy, actually calculating the more than $16 trillion-dollar U.S. GDP—along with how it is changing every few months—is a full-time job for a brigade of government statisticians.

What is Counted in GDP	**What is not included in GDP**
Consumption	Intermediate goods
Business investment	Transfer payments and non-market activities

What is Counted in GDP	What is not included in GDP
Government spending on goods and services	Used goods
Net exports	Illegal goods

Counting GDP

Notice the items that are not counted into GDP, as outlined in [link]. The sales of used goods are not included because they were produced in a previous year and are part of that year's GDP. The entire underground economy of services paid "under the table" and illegal sales should be counted, but is not, because it is impossible to track these sales. In a recent study by Friedrich Schneider of shadow economies, the underground economy in the United States was estimated to be 6.6% of GDP, or close to $2 trillion dollars in 2013 alone. Transfer payments, such as payment by the government to individuals, are not included, because they do not represent production. Also, production of some goods—such as home production as when you make your breakfast—is not counted because these goods are not sold in the marketplace.

Note:
Visit this website to read about the "New Underground Economy."



Other Ways to Measure the Economy

Besides GDP, there are several different but closely related ways of measuring the size of the economy. We mentioned above that GDP can be thought of as total production and as total purchases. It can also be thought of as total income since anything produced and sold produces income.

One of the closest cousins of GDP is the **gross national product (GNP)**. GDP includes only what is produced within a country's borders. GNP adds what is produced by domestic businesses and labor abroad, and subtracts out any payments sent home to other countries by foreign labor and businesses located in the United States. In other words, GNP is based more on the production of citizens and firms of a country, wherever they are located, and GDP is

based on what happens within the geographic boundaries of a certain country. For the United States, the gap between GDP and GNP is relatively small; in recent years, only about 0.2%. For small nations, which may have a substantial share of their population working abroad and sending money back home, the difference can be substantial.

Net national product (NNP) is calculated by taking GNP and then subtracting the value of how much physical capital is worn out, or reduced in value because of aging, over the course of a year. The process by which capital ages and loses value is called **depreciation**. The NNP can be further subdivided into **national income**, which includes all income to businesses and individuals, and personal income, which includes only income to people.

For practical purposes, it is not vital to memorize these definitions. However, it is important to be aware that these differences exist and to know what statistic you are looking at, so that you do not accidentally compare, say, GDP in one year or for one country with GNP or NNP in another year or another country. To get an idea of how these calculations work, follow the steps in the following Work It Out feature.

Note:
Calculating GDP, Net Exports, and NNP
Based on the information in [link]:

a. What is the value of GDP?
b. What is the value of net exports?
c. What is the value of NNP?

Government purchases	$120 billion
Depreciation	$40 billion
Consumption	$400 billion
Business Investment	$60 billion
Exports	$100 billion
Imports	$120 billion
Income receipts from rest of the world	$10 billion
Income payments to rest of the world	$8 billion

Step 1. To calculate GDP use the following formula:
Equation:

$$\begin{aligned}\text{GDP} &= \text{Consumption} + \text{Investment} + \text{Government spending} + (\text{Exports} - \text{Imports}) \\ &= \text{C} + \text{I} + \text{G} + (\text{X} - \text{M}) \\ &= \$400 + \$60 + \$120 + (\$100 - \$120) \\ &= \$560 \text{ billion}\end{aligned}$$

Step 2. To calculate net exports, subtract imports from exports.
Equation:

$$\begin{aligned}\text{Net exports} &= \text{X} - \text{M} \\ &= \$100 - \$120 \\ &= -\$20 \text{ billion}\end{aligned}$$

Step 3. To calculate NNP, use the following formula:
Equation:

$$\begin{aligned}\text{NNP} &= \text{GDP} + \text{Income receipts from the rest of the world} \\ &\quad - \text{Income payments to the rest of the world} - \text{Depreciation} \\ &= \$560 + \$10 - \$8 - \$40 \\ &= \$522 \text{ billion}\end{aligned}$$

Key Concepts and Summary

The size of a nation’s economy is commonly expressed as its gross domestic product (GDP), which measures the value of the output of all goods and services produced within the country in a year. GDP is measured by taking the quantities of all goods and services produced, multiplying them by their prices, and summing the total. Since GDP measures what is bought and sold in the economy, it can be measured either by the sum of what is purchased in the economy or what is produced.

Demand can be divided into consumption, investment, government, exports, and imports. What is produced in the economy can be divided into durable goods, nondurable goods, services, structures, and inventories. To avoid double counting, GDP counts only final output of goods and services, not the production of intermediate goods or the value of labor in the chain of production.

Self-Check Questions

Exercise:

Problem:

Country A has export sales of $20 billion, government purchases of $1,000 billion, business investment is $50 billion, imports are $40 billion, and consumption spending is $2,000 billion. What is the dollar value of GDP?

Solution:

GDP is C + I + G + (X – M). GDP = $2,000 billion + $50 billion + $1,000 billion + ($20 billion – $40 billion) = $3,030

Exercise:

Problem: Which of the following are included in GDP, and which are not?

a. The cost of hospital stays
b. The rise in life expectancy over time
c. Child care provided by a licensed day care center
d. Child care provided by a grandmother
e. The sale of a used car
f. The sale of a new car
g. The greater variety of cheese available in supermarkets
h. The iron that goes into the steel that goes into a refrigerator bought by a consumer.

Solution:

a. Hospital stays are part of GDP.
b. Changes in life expectancy are not market transactions and not part of GDP.
c. Child care that is paid for is part of GDP.
d. If Grandma gets paid and reports this as income, it is part of GDP, otherwise not.
e. A used car is not produced this year, so it is not part of GDP.
f. A new car is part of GDP.
g. Variety does not count in GDP, where the cheese could all be cheddar.
h. The iron is not counted because it is an intermediate good.

Review Questions

Exercise:

Problem: What are the main components of measuring GDP with what is demanded?

Exercise:

Problem: What are the main components of measuring GDP with what is produced?

Exercise:

Problem:

Would you usually expect GDP as measured by what is demanded to be greater than GDP measured by what is supplied, or the reverse?

Exercise:

Problem: Why must double counting be avoided when measuring GDP?

Critical Thinking Question

Exercise:

Problem:

U.S. macroeconomic data are thought to be among the best in the world. Given what you learned in the Clear It Up "How do statisticians measure GDP?", does this surprise you? Or does this simply reflect the complexity of a modern economy?

Exercise:

Problem: What does GDP not tell us about the economy?

Problem

Exercise:

Problem:

Last year, a small nation with abundant forests cut down $200 worth of trees. $100 worth of trees were then turned into $150 worth of lumber. $100 worth of that lumber was used to produce $250 worth of bookshelves. Assuming the country produces no other outputs, and there are no other inputs used in the production of trees, lumber, and bookshelves, what is this nation's GDP? In other words, what is the value of the final goods produced including trees, lumber and bookshelves?

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Glossary

depreciation
: the process by which capital ages over time and therefore loses its value

double counting
: a potential mistake to be avoided in measuring GDP, in which output is counted more than once as it travels through the stages of production

durable good
: long-lasting good like a car or a refrigerator

final good and service
: output used directly for consumption, investment, government, and trade purposes; contrast with “intermediate good”

gross domestic product (GDP)
: the value of the output of all goods and services produced within a country in a year

gross national product (GNP)
: includes what is produced domestically and what is produced by domestic labor and business abroad in a year

intermediate good
: output provided to other businesses at an intermediate stage of production, not for final users; contrast with “final good and service”

inventory
: good that has been produced, but not yet been sold

national income
: includes all income earned: wages, profits, rent, and profit income

net national product (NNP)
: GDP minus depreciation

nondurable good
: short-lived good like food and clothing

service
: product which is intangible (in contrast to goods) such as entertainment, healthcare, or education

structure
: building used as residence, factory, office building, retail store, or for other purposes

trade balance
: gap between exports and imports

trade deficit
: exists when a nation's imports exceed its exports and is calculated as imports –exports

trade surplus
: exists when a nation's exports exceed its imports and is calculated as exports – imports

Adjusting Nominal Values to Real Values

By the end of this section, you will be able to:

- Contrast nominal GDP and real GDP
- Explain GDP deflator
- Calculate real GDP based on nominal GDP values

When examining economic statistics, there is a crucial distinction worth emphasizing. The distinction is between nominal and real measurements, which refer to whether or not inflation has distorted a given statistic. Looking at economic statistics without considering inflation is like looking through a pair of binoculars and trying to guess how close something is: unless you know how strong the lenses are, you cannot guess the distance very accurately. Similarly, if you do not know the rate of inflation, it is difficult to figure out if a rise in GDP is due mainly to a rise in the overall level of prices or to a rise in quantities of goods produced. The **nominal value** of any economic statistic means the statistic is measured in terms of actual prices that exist at the time. The **real value** refers to the same statistic after it has been adjusted for inflation. Generally, it is the real value that is more important.

Converting Nominal to Real GDP

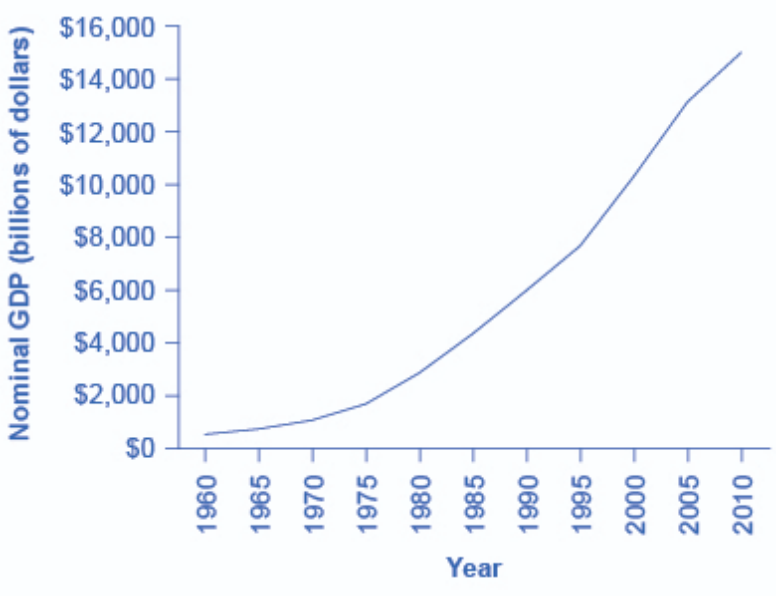
[link] shows U.S. GDP at five-year intervals since 1960 in nominal dollars; that is, GDP measured using the actual market prices prevailing in each stated year. This data is also reflected in the graph shown in [link]

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)
1960	543.3	19.0

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)
1965	743.7	20.3
1970	1,075.9	24.8
1975	1,688.9	34.1
1980	2,862.5	48.3
1985	4,346.7	62.3
1990	5,979.6	72.7
1995	7,664.0	81.7
2000	10,289.7	89.0
2005	13,095.4	100.0
2010	14,958.3	110.0

U.S. Nominal GDP and the GDP Deflator(Source: www.bea.gov)

U.S. Nominal GDP, 1960–2010

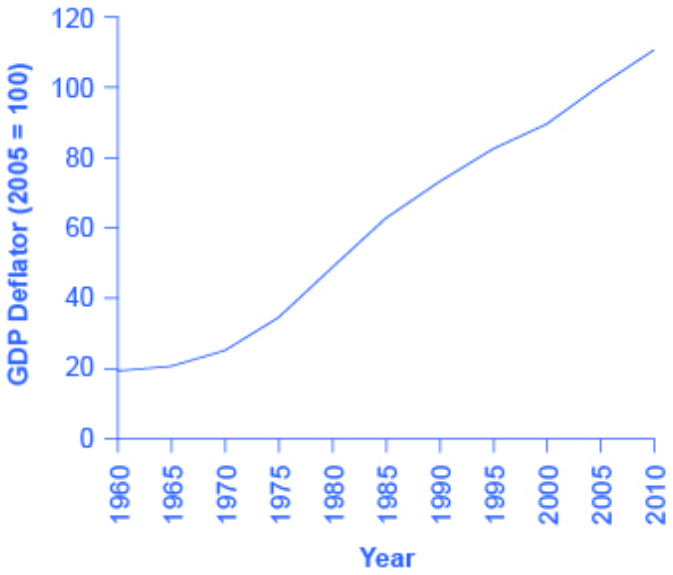


Nominal GDP values have risen exponentially from 1960 through 2010, according to the BEA.

If an unwary analyst compared nominal GDP in 1960 to nominal GDP in 2010, it might appear that national output had risen by a factor of twenty-seven over this time (that is, GDP of $14,958 billion in 2010 divided by GDP of $543 billion in 1960). This conclusion would be highly misleading. Recall that nominal GDP is defined as the quantity of every good or service produced multiplied by the price at which it was sold, summed up for all goods and services. In order to see how much production has actually increased, we need to extract the effects of higher prices on nominal GDP. This can be easily done, using the GDP deflator.

GDP deflator is a price index measuring the average prices of all goods and services included in the economy. We explore price indices in detail and how they are computed in Inflation, but this definition will do in the context of this chapter. The data for the GDP deflator are given in [link] and shown graphically in [link].

U.S. GDP Deflator, 1960–2010



Much like nominal GDP, the GDP deflator has risen exponentially from 1960 through 2010. (Source: BEA)

[link] shows that the price level has risen dramatically since 1960. The price level in 2010 was almost six times higher than in 1960 (the deflator for 2010 was 110 versus a level of 19 in 1960). Clearly, much of the apparent growth in nominal GDP was due to inflation, not an actual change in the quantity of goods and services produced, in other words, not in real GDP. Recall that nominal GDP can rise for two reasons: an increase in output, and/or an increase in prices. What is needed is to extract the increase in prices from nominal GDP so as to measure only changes in output. After all, the dollars used to measure nominal GDP in 1960 are worth more than the inflated dollars of 1990—and the price index tells exactly how much more. This adjustment is easy to do if you understand that nominal measurements are in value terms, where

Equation:

$$\text{Value} = \text{Price} \times \text{Quantity}$$

or

$$\text{Nominal GDP} = \text{GDP Deflator} \times \text{Real GDP}$$

Let’s look at an example at the micro level. Suppose the t-shirt company, Coolshirts, sells 10 t-shirts at a price of $9 each.
Equation:

$$\begin{aligned}\text{Coolshirt's nominal revenue from sales} &= \text{Price} \times \text{Quantity} \\ &= \$9 \times 10 \\ &= \$90\end{aligned}$$

Then,
Equation:

$$\begin{aligned}\text{Coolshirt's real income} &= \frac{\text{Nominal revenue}}{\text{Price}} \\ &= \frac{\$90}{\$9} \\ &= 10\end{aligned}$$

In other words, when we compute “real” measurements we are trying to get at actual quantities, in this case, 10 t-shirts.

With GDP, it is just a tiny bit more complicated. We start with the same formula as above:
Equation:

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price Index}}$$

For reasons that will be explained in more detail below, mathematically, a price index is a two-digit decimal number like 1.00 or 0.85 or 1.25. Because some people have trouble working with decimals, when the price index is published, it has traditionally been multiplied by 100 to get integer numbers like 100, 85, or 125. What this means is that when we “deflate” nominal figures to get real figures (by dividing the nominal by the price index). We also need to remember to divide the published price index by 100 to make the math work. So the formula becomes:

Equation:

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price Index} / 100}$$

Now read the following Work It Out feature for more practice calculating real GDP.

Note:
Computing GDP
It is possible to use the data in [link] to compute real GDP.
Step 1. Look at [link], to see that, in 1960, nominal GDP was $543.3 billion and the price index (GDP deflator) was 19.0.
Step 2. To calculate the real GDP in 1960, use the formula:
Equation:

$$\begin{aligned}\text{Real GDP} &= \frac{\text{Nominal GDP}}{\text{Price Index} / 100} \\ &= \frac{\$543.3 \text{ billion}}{19 / 100} \\ &= \$2{,}859.5 \text{ billion}\end{aligned}$$

We'll do this in two parts to make it clear. First adjust the price index: 19 divided by 100 = 0.19. Then divide into nominal GDP: $543.3 billion / 0.19 = $2,859.5 billion.
Step 3. Use the same formula to calculate the real GDP in 1965.
Equation:

$$\begin{aligned}\text{Real GDP} &= \frac{\text{Nominal GDP}}{\text{Price Index} / 100} \\ &= \frac{\$743.7 \text{ billion}}{20.3 / 100} \\ &= \$3{,}663.5 \text{ billion}\end{aligned}$$

Step 4. Continue using this formula to calculate all of the real GDP values from 1960 through 2010. The calculations and the results are shown in [link].

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)	Calculations	Real GDP (billions of 2005 dollars)
1960	543.3	19.0	543.3 / (19.0/100)	2859.5
1965	743.7	20.3	743.7 / (20.3/100)	3663.5
1970	1075.9	24.8	1,075.9 / (24.8/100)	4338.3
1975	1688.9	34.1	1,688.9 / (34.1/100)	4952.8
1980	2862.5	48.3	2,862.5 / (48.3/100)	5926.5
1985	4346.7	62.3	4,346.7 / (62.3/100)	6977.0
1990	5979.6	72.7	5,979.6 / (72.7/100)	8225.0
1995	7664.0	82.0	7,664 / (82.0/100)	9346.3
2000	10289.7	89.0	10,289.7 / (89.0/100)	11561.5
2005	13095.4	100.0	13,095.4 / (100.0/100)	13095.4

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)	Calculations	Real GDP (billions of 2005 dollars)
2010	14958.3	110.0	14,958.3 / (110.0/100)	13598.5

Converting Nominal to Real GDP(Source: Bureau of Economic Analysis, www.bea.gov)

There are a couple things to notice here. Whenever you compute a real statistic, one year (or period) plays a special role. It is called the base year (or base period). The base year is the year whose prices are used to compute the real statistic. When we calculate real GDP, for example, we take the quantities of goods and services produced in each year (for example, 1960 or 1973) and multiply them by their prices in the base year (in this case, 2005), so we get a measure of GDP that uses prices that do not change from year to year. That is why real GDP is labeled “Constant Dollars” or “2005 Dollars,” which means that real GDP is constructed using prices that existed in 2005. The formula used is:
Equation:

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

Rearranging the formula and using the data from 2005:
Equation:

$$\begin{aligned} \text{Real GDP} &= \frac{\text{Nominal GDP}}{\text{Price Index} \,/\, 100} \\ &= \frac{\$13{,}095.4 \text{ billion}}{100 \,/\, 100} \\ &= \$13{,}095.4 \text{ billion} \end{aligned}$$

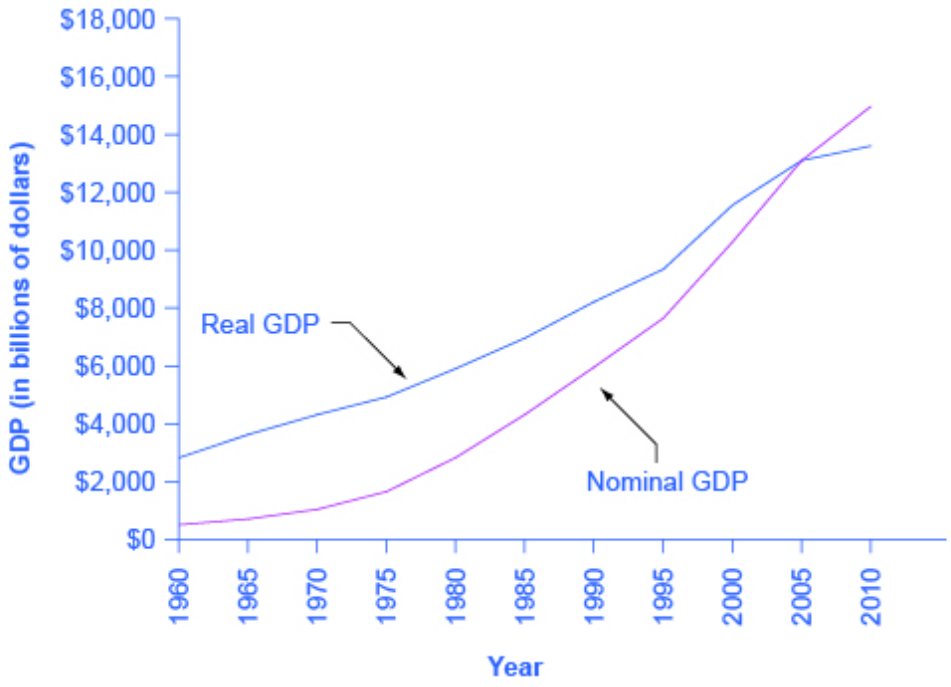
Comparing real GDP and nominal GDP for 2005, you see they are the same. This is no accident. It is because 2005 has been chosen as the “base year” in this example. Since the price index in the base year always has a

value of 100 (by definition), nominal and real GDP are always the same in the base year.
Look at the data for 2010.
Equation:

$$\begin{aligned}\text{Real GDP} &= \frac{\text{Nominal GDP}}{\text{Price Index} / 100} \\ &= \frac{\$14{,}958.3 \text{ billion}}{110 / 100} \\ &= \$13{,}598.5 \text{ billion}\end{aligned}$$

Use this data to make another observation: As long as inflation is positive, meaning prices increase on average from year to year, real GDP should be less than nominal GDP in any year after the base year. The reason for this should be clear: The value of nominal GDP is “inflated” by inflation. Similarly, as long as inflation is positive, real GDP should be greater than nominal GDP in any year before the base year.

[link] shows the U.S. nominal and real GDP since 1960. Because 2005 is the base year, the nominal and real values are exactly the same in that year. However, over time, the rise in nominal GDP looks much larger than the rise in real GDP (that is, the nominal GDP line rises more steeply than the real GDP line), because the rise in nominal GDP is exaggerated by the presence of inflation, especially in the 1970s.
U.S. Nominal and Real GDP, 1960–2012



The red line measures U.S. GDP in nominal dollars. The black line measures U.S. GDP in real dollars, where all dollar values have been converted to 2005 dollars. Since real GDP is expressed in 2005 dollars, the two lines cross in 2005. However, real GDP will appear higher than nominal GDP in the years before 2005, because dollars were worth less in 2005 than in previous years. Conversely, real GDP will appear lower in the years after 2005, because dollars were worth more in 2005 than in later years.

Let's return to the question posed originally: How much did GDP increase in real terms? What was the rate of growth of real GDP from 1960 to 2010? To find the real growth rate, we apply the formula for percentage change:

Equation:

$$\frac{\text{2010 real GDP} - \text{1960 real GDP}}{\text{1960 real GDP}} \times 100 = \% \text{ change}$$

$$\frac{13{,}598.5 - 2{,}859.5}{2{,}859.5} \times 100 = 376\%$$

In other words, the U.S. economy has increased real production of goods and services by nearly a factor of four since 1960. Of course, that understates the material improvement since it fails to capture improvements in the quality of products and the invention of new products.

There is a quicker way to answer this question approximately, using another math trick. Because:

Equation:

$$\begin{aligned} \text{Nominal} &= \text{Price} \times \text{Quantity} \\ \%\ \text{change in Nominal} &= \%\ \text{change in Price} + \%\ \text{change in Quantity} \\ &\text{OR} \\ \%\ \text{change in Quantity} &= \%\ \text{change in Nominal} - \%\ \text{change in Price} \end{aligned}$$

Therefore, the growth rate of real GDP (% change in quantity) equals the growth rate in nominal GDP (% change in value) minus the inflation rate (% change in price).

Note that using this equation provides an approximation for small changes in the levels. For more accurate measures, one should use the first formula shown.

Key Concepts and Summary

The nominal value of an economic statistic is the commonly announced value. The real value is the value after adjusting for changes in inflation. To convert nominal economic data from several different years into real, inflation-adjusted data, the starting point is to choose a base year arbitrarily and then use a price index to convert the measurements so that they are measured in the money prevailing in the base year.

Self-Check Question

Exercise:

Problem:

Using data from [link] how much of the nominal GDP growth from 1980 to 1990 was real GDP and how much was inflation?

Solution:

From 1980 to 1990, real GDP grew by (8,225.0 – 5,926.5) / (5,926.5) = 39%. Over the same period, prices increased by (72.7 – 48.3) / (48.3/100) = 51%. So about 57% of the growth 51 / (51 + 39) was inflation, and the remainder: 39 / (51 + 39) = 43% was growth in real GDP.

Review Questions

Exercise:

Problem:

What is the difference between a series of economic data over time measured in nominal terms versus the same data series over time measured in real terms?

Exercise:

Problem:

How do you convert a series of nominal economic data over time to real terms?

Critical Thinking Question

Exercise:

Problem:

Should people typically pay more attention to their real income or their nominal income? If you choose the latter, why would that make sense in today's world? Would your answer be the same for the 1970s?

Problems

Exercise:

Problem:

The "prime" interest rate is the rate that banks charge their best customers. Based on the nominal interest rates and inflation rates given in [link], in which of the years given would it have been best to be a lender? Based on the nominal interest rates and inflation rates given in [link], in which of the years given would it have been best to be a borrower?

Year	Prime Interest Rate	Inflation Rate
1970	7.9%	5.7%
1974	10.8%	11.0%
1978	9.1%	7.6%
1981	18.9%	10.3%

Exercise:

Problem:

A mortgage loan is a loan that a person makes to purchase a house. [link] provides a list of the mortgage interest rate being charged for several different years and the rate of inflation for each of those years. In which years would it have been better to be a person borrowing money from a bank to buy a home? In which years would it have been better to be a bank lending money?

Year	Mortgage Interest Rate	Inflation Rate
1984	12.4%	4.3%
1990	10%	5.4%
2001	7.0%	2.8%

Glossary

nominal value
: the economic statistic actually announced at that time, not adjusted for inflation; contrast with real value

real value
: an economic statistic after it has been adjusted for inflation; contrast with nominal value

Introduction to Unemployment
class="introduction"
Out of Business

Borders was one of the many companies unable to recover from the economic recession of 2008-2009. (Credit: modification of work by Luis Villa del Campo/Flickr Creative Commons)



Note:

The Mysterious Case of the Missing Candidates

Nearly eight million U.S. jobs were lost during the Great Recession of 2008-2009, with unemployment peaking at 10% in October 2009, according to the Bureau of Labor Statistics (BLS). That is a huge number of positions gone. During the tepid recovery, some positions were added, but as of summer 2013, unemployment had remained persistently higher than the pre-recession rate of less than 5%. Some economists and policymakers worried the recovery would be "jobless." With the economy growing, albeit slowly, why wasn't the unemployment number falling? Why were firms not hiring?

Peter Cappelli, noted Wharton management professor and Director of Wharton's Center for Human Resources, does not believe the job search process is akin to what he terms the "Home Depot" view of hiring. According to him, this view "basically says that filling a job is like replacing a part in a washing machine. You simply find someone who does the exact same job as that broken part, plug him or her into the washing

machine and that is it.” The job search, for both the prospective employee and the employer, is more complex than that.

In a hiring situation, employers hold all the cards. They write the job descriptions, determine the salaries, decide when and how to advertise positions, and set the controls on employment application screening software. Advertising for positions has increased as the economic recovery progresses, yet here’s the kicker: Employers say there are no applicants out there who meet their needs. While the unemployment rate is now below 6% as of the beginning of 2015, many economists and policymakers (including the Chair of the Federal Reserve, Janet Yellen) are still concerned about "slack" in the labor market. So the question arises: where are the job candidates?

That question leads us to the topic of this chapter—unemployment. What constitutes it? How is it measured? And if the economy is growing, why isn’t the pool of job openings growing along with it? Sounds like the economy has a case of “missing” candidates.

Note:

Introduction to Unemployment

In this chapter, you will learn about:

- How the Unemployment Rate is Defined and Computed
- Patterns of Unemployment
- What Causes Changes in Unemployment over the Short Run
- What Causes Changes in Unemployment over the Long Run

Unemployment can be a terrible and wrenching life experience—like a serious automobile accident or a messy divorce—whose consequences can be fully understood only by someone who has gone through it. For unemployed individuals and their families, there is the day-to-day financial stress of not knowing where the next paycheck is coming from. There are painful adjustments, like watching your savings account dwindle, selling a car and buying a cheaper one, or moving to a less expensive place to live.

Even when the unemployed person finds a new job, it may pay less than the previous one. For many people, their job is an important part of their self worth. When unemployment separates people from the workforce, it can affect family relationships as well as mental and physical health.

The human costs of unemployment alone would justify making a low level of unemployment an important public policy priority. But unemployment also includes economic costs to the broader society. When millions of unemployed but willing workers cannot find jobs, an economic resource is going unused. An economy with high unemployment is like a company operating with a functional but unused factory. The opportunity cost of unemployment is the output that could have been produced by the unemployed workers.

This chapter will discuss how the unemployment rate is defined and computed. It will examine the patterns of unemployment over time, for the U.S. economy as a whole, for different demographic groups in the U.S. economy, and for other countries. It will then consider an economic explanation for unemployment, and how it explains the patterns of unemployment and suggests public policies for reducing it.

How the Unemployment Rate is Defined and Computed

By the end of this section, you will be able to:

- Calculate the labor force percentage and the unemployment rate
- Explain hidden unemployment and what it means to be in or out of the labor force
- Evaluate the collection and interpretation of unemployment data

Unemployment is typically described in newspaper or television reports as a percentage or a rate. A recent report might have said, for example, *from August 2009 to November 2009, the U.S. unemployment rate rose from 9.7% to 10.0%, but by June 2010, it had fallen to 9.5%*. At a glance, the changes between the percentages may seem small. But remember that the U.S. economy has about 155 million adults who either have jobs or are looking for them. A rise or fall of just 0.1% in the unemployment rate of 155 million potential workers translates into 155,000 people, which is roughly the total population of a city like Syracuse, New York, Brownsville, Texas, or Pasadena, California. Large rises in the unemployment rate mean large numbers of job losses. In November 2009, at the peak of the recession, about 15 million people were out of work. Even with the unemployment rate now at 5.5% as of February 2015, about 8 million people total are out of work.

Note:
The Bureau of Labor Statistics tracks and reports all data related to unemployment.



Who’s In or Out of the Labor Force?

Should everyone without a job be counted as unemployed? Of course not. Children, for example, should not be counted as unemployed. Surely, the retired should not be counted as unemployed. Many full-time college students have only a part-time job, or no job at all, but it seems inappropriate to count them as suffering the pains of unemployment. Some people are not working because they are rearing children, ill, on vacation, or on parental leave.

The point is that the adult population is not just divided into employed and unemployed. A third group exists: people who do not have a job, and for some reason—retirement, looking after children, taking a voluntary break before a new job—are not interested in having a job, either. It also includes those who do want a job but have quit looking, often due to being discouraged by their inability to find suitable employment. Economists refer to this third group of those who are not working and not looking for work as **out of the labor force** or not in the labor force.

The U.S. unemployment rate, which is based on a monthly survey carried out by the U.S. Bureau of the Census, asks a series of questions to divide up the adult population into employed, unemployed, or not in the labor force. To be classified as unemployed, a person must be without a job, currently available to work, and actively looking for work in the previous four weeks. Thus, a person who does not have a job but who is not currently available to work or has not actively looked for work in the last four weeks is counted as out of the labor force.

Employed: currently working for pay

Unemployed: Out of work and actively looking for a job

Out of the labor force: Out of paid work and not actively looking for a job

Labor force: the number of employed plus the unemployed

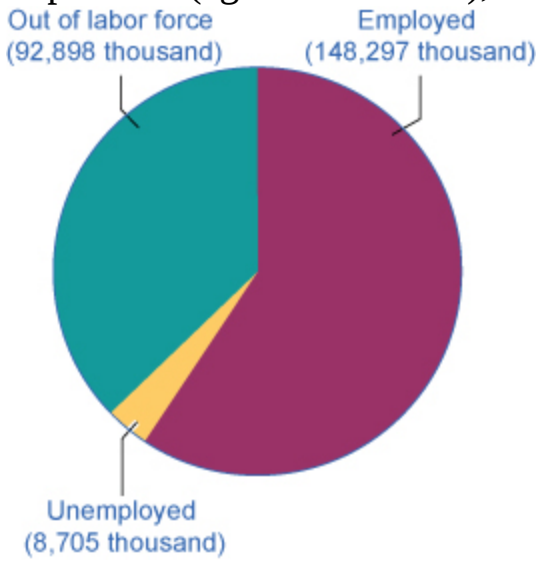
Calculating the Unemployment Rate

[link] shows the three-way division of the over-16 adult population. In February 2015, about 62.8% of the adult population was "in the labor force"; that is, people are either employed or without a job but looking for work. Those in the labor force can be divided into the employed and the unemployed. These values are also shown in [link]. The **unemployment rate** is not the percentage of the total adult population without jobs, but rather the percentage of adults who are in the labor force but who do not have jobs:

Equation:

$$\text{Unemployment rate} = \frac{\text{Unemployed people}}{\text{Total labor force}} \times 100$$

Employed, Unemployed, and Out of the Labor Force Distribution of Adult Population (age 16 and older), February 2015



The total adult, working-age population in February 2015 was 249.9 million. Out of this total population, 148.3 were classified as employed, and 8.7 million were classified as unemployed. The remaining 92.9 were classified as out of the labor

force. As you will learn, however, this seemingly simple chart does not tell the whole story.

Total adult population over the age of 16	249.9 million
In the labor force	157 million (62.8%)
Employed	148.3 million
Unemployed	8.7 million
Out of the labor force	92.9 million (37.2%)

U.S. Employment and Unemployment, February 2015(Source: http://www.bls.gov/news.release/empsit.t01.htm)

In this example, the unemployment rate can be calculated as 8.7 million unemployed people divided by 157 million people in the labor force, which works out to a 5.5% rate of unemployment. The following Work It Out feature will walk you through the steps of this calculation.

Note:
Calculating Labor Force Percentages
So how do economists arrive at the percentages in and out of the labor force and the unemployment rate? We will use the values in [link] to illustrate the steps.
To determine the percentage in the labor force:

Step 1. Divide the number of people in the labor force (157 million) by the total adult (working-age) population (249.9 million).
Step 2. Multiply by 100 to obtain the percentage.
Equation:

$$\begin{aligned}\text{Percentage in the labor force} &= \frac{157}{249.9} \\ &= 0.6282 \\ &= 62.8\%\end{aligned}$$

To determine the percentage out of the labor force:
Step 1. Divide the number of people out the labor force (92.9 million) by the total adult (working-age) population (249.9 million).
Step 2. Multiply by 100 to obtain the percentage.
Equation:

$$\begin{aligned}\text{Percentage in the labor force} &= \frac{92.9}{249.9} \\ &= 0.3717 \\ &= 37.2\%\end{aligned}$$

To determine the unemployment rate:
Step 1. Divide the number of unemployed people (8.7 million) by the total labor force (157 million).
Step 2. Multiply by 100 to obtain the rate.
Equation:

$$\begin{aligned}\text{Unemployment rate} &= \frac{8.7}{157} \\ &= 0.0554 \\ &= 5.5\%\end{aligned}$$

Hidden Unemployment

Even with the “out of the labor force” category, there are still some people that are mislabeled in the categorization of employed, unemployed, or out

of the labor force. There are some people who have only part time or temporary jobs and who are looking for full time and permanent employment that are counted as employed, though they are not employed in the way they would like or need to be. Additionally, there are individuals who are **underemployed**. This includes those that are trained or skilled for one type or level of work who are working in a lower paying job or one that does not utilize their skills. For example, an individual with a college degree in finance who is working as a sales clerk would be considered underemployed. They are, however, also counted in the employed group. All of these individuals fall under the umbrella of the term "hidden unemployment." **Discouraged workers**, those who have stopped looking for employment and, hence, are no longer counted in the unemployed also fall into this group

Labor Force Participation Rate

Another important statistic is the **labor force participation rate**. This is the percentage of adults in an economy who are either employed or who are unemployed and looking for a job. So, using the data in [link] and [link], those included in this calculation would be the 157 million individuals in the labor force. The rate is calculated by taking the number of people in the labor force, that is, the number employed and the number unemployed, divided by the total adult population and multiplying by 100 to get the percentage. For the data from February 2015, the labor force participation rate is 62.8%. Historically, the civilian labor force participation rate in the United States climbed beginning in the 1960s as women increasingly entered the workforce, and it peaked at around 68% in late 1999 to early 2000. Since then, the labor force participation rate has steadily declined.

The Establishment Payroll Survey

When the unemployment report comes out each month, the Bureau of Labor Statistics (BLS) also reports on the number of jobs created—which comes from the establishment payroll survey. The payroll survey is based on a survey of about 140,000 businesses and government agencies throughout the United States. It generates payroll employment estimates by

the following criteria: all employees, average weekly hours worked, and average hourly, weekly, and overtime earnings. One of the criticisms of this survey is that it does not count the self-employed. It also does not make a distinction between new, minimum wage, part time or temporary jobs and full time jobs with “decent” pay.

How Is the U.S. Unemployment Data Collected?

The unemployment rate announced by the U.S. Bureau of Labor Statistics each month is based on the Current Population Survey (CPS), which has been carried out every month since 1940. Great care is taken to make this survey representative of the country as a whole. The country is first divided into 3,137 areas. The U.S. Bureau of the Census then selects 729 of these areas to survey. The 729 areas are then divided into districts of about 300 households each, and each district is divided into clusters of about four dwelling units. Every month, Census Bureau employees call about 15,000 of the four-household clusters, for a total of 60,000 households. Households are interviewed for four consecutive months, then rotated out of the survey for eight months, and then interviewed again for the same four months the following year, before leaving the sample permanently.

Based on this survey, unemployment rates are calculated by state, industry, urban and rural areas, gender, age, race or ethnicity, and level of education. A wide variety of other information is available, too. For example, how long have people been unemployed? Did they become unemployed because they quit, or were laid off, or their employer went out of business? Is the unemployed person the only wage earner in the family? The Current Population Survey is a treasure trove of information about employment and unemployment. If you are wondering what the difference is between the CPS and EPS, read the following Clear it Up feature.

Note:
What is the difference between CPS and EPS?
The Current Population Survey (CPS) conducted by the United States Census Bureau measures the percentage of the labor force that is

unemployed. The establishment payroll survey (EPS) by the Bureau of Labor Statistics is a payroll survey that measures the net change in jobs created for the month.

Criticisms of Measuring Unemployment

There are always complications in measuring the number of unemployed. For example, what about people who do not have jobs and would be available to work, but have gotten discouraged at the lack of available jobs in their area and stopped looking? Such people, and their families, may be suffering the pains of unemployment. But the survey counts them as out of the labor force because they are not actively looking for work. Other people may tell the Census Bureau that they are ready to work and looking for a job but, truly, they are not that eager to work and are not looking very hard at all. They are counted as unemployed, although they might more accurately be classified as out of the labor force. Still other people may have a job, perhaps doing something like yard work, child care, or cleaning houses, but are not reporting the income earned to the tax authorities. They may report being unemployed, when they actually are working.

Although the unemployment rate gets most of the public and media attention, economic researchers at the Bureau of Labor Statistics publish a wide array of surveys and reports that try to measure these kinds of issues and to develop a more nuanced and complete view of the labor market. It is not exactly a hot news flash that economic statistics are imperfect. Even imperfect measures like the unemployment rate, however, can still be quite informative, when interpreted knowledgeably and sensibly.

Note:
Click here to learn more about the CPS to read frequently asked questions about employment and labor.



Key Concepts and Summary

Unemployment imposes high costs. Unemployed individuals suffer from loss of income and from stress. An economy with high unemployment suffers an opportunity cost of unused resources. The adult population can be divided into those in the labor force and those out of the labor force. In turn, those in the labor force are divided into employed and unemployed. A person without a job must be willing and able to work and actively looking for work to be counted as unemployed; otherwise, a person without a job is counted as being out of the labor force. The unemployment rate is defined as the number of unemployed persons divided by the number of persons in the labor force (not the overall adult population). The Current Population Survey (CPS) conducted by the United States Census Bureau measures the percentage of the labor force that is unemployed. The establishment payroll survey by the Bureau of Labor Statistics measures the net change in jobs created for the month.

Self-Check Questions

Exercise:

Problem:

Suppose the adult population over the age of 16 is 237.8 million and the labor force is 153.9 million (of whom 139.1 million are employed). How many people are “not in the labor force?” What are the proportions of employed, unemployed and not in the labor force in the population? *Hint*: Proportions are percentages.

Solution:

The population is divided into those “in the labor force” and those “not in the labor force.” Thus, the number of adults not in the labor force is 237.8 – 153.9 = 83.9 million. Since the labor force is divided into employed persons and unemployed persons, the number of unemployed persons is 153.9 – 139.1 = 14.8 million. Thus, the adult population has the following proportions:

- 139.1/237.8 = 58.5% employed persons
- 14.8/237.8 = 6.2% unemployed persons
- 83.9/237.8 = 35.3% persons out of the labor force

Exercise:

Problem:

Using the above data, what is the unemployment rate? These data are U.S. statistics from 2010. How does it compare to the February 2015 unemployment rate computed earlier?

Solution:

The unemployment rate is defined as the number of unemployed persons as a percentage of the labor force or 14.8/153.9 = 9.6%. This is higher than the February 2015 unemployment rate, computed earlier, of 5.5%.

Review Questions

Exercise:

Problem:

What is the difference between being unemployed and being out of the labor force?

Exercise:

Problem:

How is the unemployment rate calculated? How is the labor force participation rate calculated?

Exercise:

Problem: Are all adults who do not hold jobs counted as unemployed?

Exercise:

Problem:

If you are out of school but working part time, are you considered employed or unemployed in U.S. labor statistics? If you are a full time student and working 12 hours a week at the college cafeteria are you considered employed or not in the labor force? If you are a senior citizen who is collecting social security and a pension and working as a greeter at Wal-Mart are you considered employed or not in the labor force?

Exercise:

Problem:

What happens to the unemployment rate when unemployed workers are reclassified as discouraged workers?

Exercise:

Problem:

What happens to the labor force participation rate when employed individuals are reclassified as unemployed? What happens when they are reclassified as discouraged workers?

Exercise:

Problem:

What are some of the problems with using the unemployment rate as an accurate measure of overall joblessness?

Exercise:

Problem:

What criteria are used by the BLS to count someone as employed? As unemployed?

Exercise:

Problem:

Assess whether the following would be counted as “unemployed” in the Current Employment Statistics survey.

A. A husband willingly stays home with children while his wife works.
B. A manufacturing worker whose factory just closed down.
C. A college student doing an unpaid summer internship.
D. A retiree.
E. Someone who has been out of work for two years but keeps looking for a job.
F. Someone who has been out of work for two months but isn’t looking for a job.
G. Someone who hates her present job and is actively looking for another one.
H. Someone who decides to take a part time job because she could not find a full time position.

Critical Thinking Questions

Exercise:

Problem:

Using the definition of the unemployment rate, is an increase in the unemployment rate necessarily a bad thing for a nation?

Exercise:

Problem:

Is a decrease in the unemployment rate necessarily a good thing for a nation? Explain.

Exercise:

Problem:

If many workers become discouraged from looking for jobs, explain how the number of jobs could decline but the unemployment rate could fall at the same time.

Exercise:

Problem:

Would you expect hidden unemployment to be higher, lower, or about the same when the unemployment rate is high, say 10%, versus low, say 4%? Explain.

Problems

Exercise:

Problem:

A country with a population of eight million adults has five million employed, 500,000 unemployed, and the rest of the adult population is out of the labor force. What's the unemployment rate? What share of population is in the labor force? Sketch a pie chart that divides the adult population into these three groups.

Glossary

discouraged workers
: those who have stopped looking for employment due to the lack of suitable positions available

labor force participation rate
: this is the percentage of adults in an economy who are either employed or who are unemployed and looking for a job

out of the labor force
: those who are not working and not looking for work—whether they want employment or not; also termed “not in the labor force”

underemployed
: individuals who are employed in a job that is below their skills

unemployment rate
: the percentage of adults who are in the labor force and thus seeking jobs, but who do not have jobs

Introduction to Inflation
class="introduction"
Big Bucks in Zimbabwe

This bill was worth 100 billion Zimbabwean dollars when issued in 2008. There were even bills issued with a face value of 100 trillion Zimbabwean dollars. The bills had $100,000,000,000,000 written on them. Unfortunately, they were almost worthless. At one point, 621,984,228 Zimbabwean dollars were equal to one U.S. dollar. Eventually, the country abandoned its own currency and allowed foreign currency to be used for purchases. (Credit: modification of work by Samantha Marx/Flickr Creative Commons)



Note:

A $550 Million Loaf of Bread?

If you were born within the last three decades in the United States, Canada, or many other countries in the developed world, you probably have no real experience with a high rate of inflation. Inflation is when most prices in an entire economy are rising. But there is an extreme form of inflation called hyperinflation. This occurred in Germany between 1921 and 1928, and more recently in Zimbabwe between 2008 and 2009. In November of 2008, Zimbabwe had an inflation rate of 79.6 billion percent. In contrast, in 2014, the United States had an average annual rate of inflation of 1.6%. Zimbabwe's inflation rate was so high it is difficult to comprehend. So, let's put it into context. It is equivalent to price increases of 98% per day. This means that, from one day to the next, prices essentially double. What is life like in an economy afflicted with hyperinflation? Not like anything you are familiar with. Prices for commodities in Zimbabwean dollars were adjusted several times *each day*. There was no desire to hold on to currency since it lost value by the minute. The people there spent a great deal of time getting rid of any cash they acquired by purchasing whatever food or other commodities they could find. At one point, a loaf of bread cost 550 million Zimbabwean dollars. Teachers were paid in the trillions a month; however this was equivalent to only one U.S. dollar a day. At its

height, it took 621,984,228 Zimbabwean dollars to purchase one U.S. dollar.
Government agencies had no money to pay their workers so they started printing money to pay their bills rather than raising taxes. Rising prices caused the government to enact price controls on private businesses, which led to shortages and the emergence of black markets. In 2009, the country abandoned its currency and allowed foreign currencies to be used for purchases.
How does this happen? How can both government and the economy fail to function at the most basic level? Before we consider these extreme cases of hyperinflation, let's first look at inflation itself.

Note:
Introduction to Inflation
In this chapter, you will learn about:

- Tracking Inflation
- How Changes in the Cost of Living are Measured
- How the U.S. and Other Countries Experience Inflation
- The Confusion Over Inflation
- Indexing and Its Limitations

Inflation is a general and ongoing rise in the level of prices in an entire economy. Inflation does not refer to a change in relative prices. A relative price change occurs when you see that the price of tuition has risen, but the price of laptops has fallen. Inflation, on the other hand, means that there is pressure for prices to rise in most markets in the economy. In addition, price increases in the supply-and-demand model were one-time events, representing a shift from a previous equilibrium to a new one. Inflation implies an ongoing rise in prices. If inflation happened for one year and then stopped—well, then it would not be inflation any more.

This chapter begins by showing how to combine prices of individual goods and services to create a measure of overall inflation. It discusses the historical and recent experience of inflation, both in the United States and in other countries around the world. Other chapters have sometimes included a note under an exhibit or a parenthetical reminder in the text saying that the numbers have been adjusted for inflation. In this chapter, it is time to show how to use inflation statistics to adjust other economic variables, so that you can tell how much of, say, the rise in GDP over different periods of time can be attributed to an actual increase in the production of goods and services and how much should be attributed to the fact that prices for most things have risen.

Inflation has consequences for people and firms throughout the economy, in their roles as lenders and borrowers, wage-earners, taxpayers, and consumers. The chapter concludes with a discussion of some imperfections and biases in the inflation statistics, and a preview of policies for fighting inflation that will be discussed in other chapters.

Tracking Inflation

By the end of this section, you will be able to:

- Calculate the annual rate of inflation
- Explain and use index numbers and base years when simplifying the total quantity spent over a year for products
- Calculate inflation rates using index numbers

Dinner table conversations where you might have heard about inflation usually entail reminiscing about when "everything seemed to cost so much less. You used to be able to buy three gallons of gasoline for a dollar and then go see an afternoon movie for another dollar." [link] compares some prices of common goods in 1970 and 2014. Of course, the average prices shown in this table may not reflect the prices where you live. The cost of living in New York City is much higher than in Houston, Texas, for example. In addition, certain products have evolved over recent decades. A new car in 2014, loaded with antipollution equipment, safety gear, computerized engine controls, and many other technological advances, is a more advanced machine (and more fuel efficient) than your typical 1970s car. However, put details like these to one side for the moment, and look at the overall pattern. The primary reason behind the price rises in [link]—and all the price increases for the other products in the economy—is not specific to the market for housing or cars or gasoline or movie tickets. Instead, it is part of a general rise in the level of all prices. In 2014, $1 had about the same purchasing power in overall terms of goods and services as 18 cents did in 1972, because of the amount of inflation that has occurred over that time period.

Items	**1970**	**2014**
Pound of ground beef	$0.66	$4.16
Pound of butter	$0.87	$2.93
Movie ticket	$1.55	$8.17
Sales price of new home (median)	$22,000	$280,000
New car	$3,000	$32,531
Gallon of gasoline	$0.36	$3.36
Average hourly wage for a manufacturing worker	$3.23	$19.55
Per capita GDP	$5,069	$53,041.98

Price Comparisons, 1970 and 2014(Sources: See chapter References at end of book.)

Moreover, the power of inflation does not affect just goods and services, but wages and income levels, too. The second-to-last row of [link] shows that the average hourly wage for a manufacturing worker increased nearly six-fold from 1970 to 2014. Sure, the average worker in 2014 is better educated and more productive than the average worker in 1970—but not six times more productive. Sure, per capita GDP increased substantially from 1970 to 2014, but is the average person in the U.S. economy really more than eight times better off in just 44 years? Not likely.

A modern economy has millions of goods and services whose prices are continually quivering in the breezes of supply and demand. How can all of these shifts in price be boiled down to a single inflation rate? As with many problems in economic measurement, the conceptual answer is reasonably straightforward: Prices of a variety of

goods and services are combined into a single price level; the inflation rate is simply the percentage change in the price level. Applying the concept, however, involves some practical difficulties.

The Price of a Basket of Goods

To calculate the price level, economists begin with the concept of a **basket of goods and services**, consisting of the different items individuals, businesses, or organizations typically buy. The next step is to look at how the prices of those items change over time. In thinking about how to combine individual prices into an overall price level, many people find that their first impulse is to calculate the average of the prices. Such a calculation, however, could easily be misleading because some products matter more than others.

Changes in the prices of goods for which people spend a larger share of their incomes will matter more than changes in the prices of goods for which people spend a smaller share of their incomes. For example, an increase of 10% in the rental rate on housing matters more to most people than whether the price of carrots rises by 10%. To construct an overall measure of the price level, economists compute a weighted average of the prices of the items in the basket, where the weights are based on the actual quantities of goods and services people buy. The following Work It Out feature walks you through the steps of calculating the annual rate of inflation based on a few products.

Note:
Calculating an Annual Rate of Inflation
Consider the simple basket of goods with only three items, represented in [link]. Say that in any given month, a college student spends money on 20 hamburgers, one bottle of aspirin, and five movies. Prices for these items over four years are given in the table through each time period (Pd). Prices of some goods in the basket may rise while others fall. In this example, the price of aspirin does not change over the four years, while movies increase in price and hamburgers bounce up and down. Each year, the cost of buying the given basket of goods at the prices prevailing at that time is shown.

Items	Hamburger	Aspirin	Movies	Total	Inflation Rate
Qty	20	1 bottle	5	-	-
(Pd 1) Price	$3.00	$10.00	$6.00	-	-
(Pd 1) Amount Spent	$60.00	$10.00	$30.00	$100.00	-
(Pd 2) Price	$3.20	$10.00	$6.50	-	-
(Pd 2) Amount Spent	$64.00	$10.00	$32.50	$106.50	6.5%
(Pd 3) Price	$3.10	$10.00	$7.00	-	-
(Pd 3) Amount Spent	$62.00	$10.00	$35.00	$107.00	0.5%
(Pd 4) Price	$3.50	$10.00	$7.50	-	-
(Pd 4) Amount Spent	$70.00	$10.00	$37.50	$117.50	9.8%

A College Student’s Basket of Goods

To calculate the annual rate of inflation in this example:
Step 1. Find the percentage change in the cost of purchasing the overall basket of goods between the time periods. The general equation for percentage changes between two years, whether in the context of inflation or in any other calculation, is:
Equation:

$$\frac{(\text{Level in new year} - \text{Level in previous year})}{\text{Level in previous year}} = \text{Percentage change}$$

Step 2. From period 1 to period 2, the total cost of purchasing the basket of goods in [link] rises from $100 to $106.50. Therefore, the percentage change over this time—the inflation rate—is:
Equation:

$$\frac{(106.50 - 100)}{100.0} = 0.065 = 6.5\%$$

Step 3. From period 2 to period 3, the overall change in the cost of purchasing the basket rises from $106.50 to $107. Thus, the inflation rate over this time, again calculated by the percentage change, is approximately:
Equation:

$$\frac{(107 - 106.50)}{106.50} = 0.0047 = 0.47\%$$

Step 4. From period 3 to period 4, the overall cost rises from $107 to $117.50. The inflation rate is thus:
Equation:

$$\frac{(117.50 - 107)}{107} = 0.098 = 9.8\%$$

This calculation of the change in the total cost of purchasing a basket of goods takes into account how much is spent on each good. Hamburgers are the lowest-priced good in this example, and aspirin is the highest-priced. If an individual buys a greater quantity of a low-price good, then it makes sense that changes in the price of that good should have a larger impact on the buying power of that person's money. The larger impact of hamburgers shows up in the "amount spent" row, where, in all time periods, hamburgers are the largest item within the amount spent row.

Index Numbers

The numerical results of a calculation based on a basket of goods can get a little messy. The simplified example in [link] has only three goods and the prices are in even dollars, not numbers like 79 cents or $124.99. If the list of products was much longer, and more realistic prices were used, the total quantity spent over a year might be some messy-looking number like $17,147.51 or $27,654.92.

To simplify the task of interpreting the price levels for more realistic and complex baskets of goods, the price level in each period is typically reported as an **index number**, rather than as the dollar amount for buying the basket of goods. Price indices are created to calculate an overall average change in relative prices over time. To convert the money spent on the basket to an index number, economists arbitrarily choose one year to be the **base year**, or starting point from which we measure changes in prices. The base year, by definition, has an index number equal to 100. This sounds complicated, but it is really a simple math trick. In the example above, say that time period 3 is chosen as the base year. Since the total amount of spending in that year is $107, we divide that amount by itself ($107) and multiply by 100. Mathematically, that is equivalent to dividing $107 by 100, or $1.07. Doing either will give us an index in the base year of 100. Again, this is because the index number in the base year *always* has to have a value of 100. Then, to figure out the values of the index number for the other years, we divide the dollar amounts for the other years by 1.07 as well. Note also that the dollar signs cancel out so that index numbers have no units.

Calculations for the other values of the index number, based on the example presented in [link] are shown in [link]. Because the index numbers are calculated so that they are in exactly the same proportion as the total dollar cost of

purchasing the basket of goods, the inflation rate can be calculated based on the index numbers, using the percentage change formula. So, the inflation rate from period 1 to period 2 would be

Equation:

$$\frac{(99.5 - 93.4)}{93.4} = 0.065 = 6.5\%$$

This is the same answer that was derived when measuring inflation based on the dollar cost of the basket of goods for the same time period.

	Total Spending	**Index Number**	**Inflation Rate Since Previous Period**
Period 1	$100	$\frac{100}{1.07} = 93.4$	
Period 2	$106.50	$\frac{106.50}{1.07} = 99.5$	$\frac{(99.5 - 93.4)}{93.4} = 0.065 = 6.5\%$
Period 3	$107	$\frac{107}{1.07} = 100.0$	$\frac{100 - 99.5}{99.5} = 0.005 = 0.5\%$
Period 4	$117.50	$\frac{117.50}{1.07} = 109.8$	$\frac{109.8 - 100}{100} = 0.098 = 9.8\%$

Calculating Index Numbers When Period 3 is the Base Year

If the inflation rate is the same whether it is based on dollar values or index numbers, then why bother with the index numbers? The advantage is that indexing allows easier eyeballing of the inflation numbers. If you glance at two index numbers like 107 and 110, you know automatically that the rate of inflation between the two years is about, but not quite exactly equal to, 3%. By contrast, imagine that the price levels were expressed in absolute dollars of a large basket of goods, so that when you looked at the data, the numbers were $19,493.62 and $20,009.32. Most people find it difficult to eyeball those kinds of numbers and say that it is a change of about 3%. However, the two numbers expressed in absolute dollars are exactly in the same proportion of 107 to 110 as the previous example. If you're wondering why simple subtraction of the index numbers wouldn't work, read the following Clear It Up feature.

Note:
Why do you not just subtract index numbers?
A word of warning: When a price index moves from, say, 107 to 110, the rate of inflation is not *exactly* 3%. Remember, the inflation rate is not derived by subtracting the index numbers, but rather through the percentage-change calculation. The precise inflation rate as the price index moves from 107 to 110 is calculated as (110 – 107) / 107 = 0.028 = 2.8%. When the base year is fairly close to 100, a quick subtraction is not a terrible shortcut to calculating the inflation rate—but when precision matters down to tenths of a percent, subtracting will not give the right answer.

Two final points about index numbers are worth remembering. First, index numbers have no dollar signs or other units attached to them. Although index numbers can be used to calculate a percentage inflation rate, the index numbers themselves do not have percentage signs. Index numbers just mirror the proportions found in other data. They transform the other data so that the data are easier to work with.

Second, the choice of a base year for the index number—that is, the year that is automatically set equal to 100—is arbitrary. It is chosen as a starting point from which changes in prices are tracked. In the official inflation statistics, it is common to use one base year for a few years, and then to update it, so that the base year of 100 is relatively close to the present. But any base year that is chosen for the index numbers will result in exactly the same inflation rate. To see this in the previous example, imagine that period 1, when total spending was $100, was also chosen as the base year, and given an index number of 100. At a glance, you can see that the index numbers would now exactly match the dollar figures, the inflation rate in the first period would be 6.5%, and so on.

Now that we see how indexes work to track inflation, the next module will show us how the cost of living is measured.

Note:
Watch this video from the cartoon *Duck Tales* to view a mini-lesson on inflation.



Key Concepts and Summary

The price level is measured by using a basket of goods and services and calculating how the total cost of buying that basket of goods will increase over time. The price level is often expressed in terms of index numbers, which transform the cost of buying the basket of goods and services into a series of numbers in the same proportion to each other, but with an arbitrary base year of 100. The rate of inflation is measured as the percentage change between price levels or index numbers over time.

Self-Check Questions

Exercise:

Problem:

[link] shows the prices of fruit purchased by the typical college student from 2001 to 2004. What is the amount spent each year on the “basket” of fruit with the quantities shown in column 2?

Items	Qty	(2001) Price	(2001) Amount Spent	(2002) Price	(2002) Amount Spent	(2003) Price	(2003) Amount Spent	(200 Price
Apples	10	$0.50		$0.75		$0.85		$0.8
Bananas	12	$0.20		$0.25		$0.25		$0.2
Grapes	2	$0.65		$0.70		$0.90		$0.9

Items	Qty	(2001) Price	(2001) Amount Spent	(2002) Price	(2002) Amount Spent	(2003) Price	(2003) Amount Spent	(200 Price
Raspberries	1	$2.00		$1.90		$2.05		$2.13
Total								

Solution:

To compute the amount spent on each fruit in each year, you multiply the quantity of each fruit by the price.

- 10 apples × 50 cents each = $5.00 spent on apples in 2001.
- 12 bananas × 20 cents each = $2.40 spent on bananas in 2001.
- 2 bunches of grapes at 65 cents each = $1.30 spent on grapes in 2001.
- 1 pint of raspberries at $2 each = $2.00 spent on raspberries in 2001.

Adding up the amounts gives you the total cost of the fruit basket. The total cost of the fruit basket in 2001 was $5.00 + $2.40 + $1.30 + $2.00 = $10.70. The total costs for all the years are shown in the following table.

2001	2002	2003	2004
$10.70	$13.80	$15.35	$16.31

Exercise:

Problem: Construct the price index for a “fruit basket” in each year using 2003 as the base year.

Solution:

If 2003 is the base year, then the index number has a value of 100 in 2003. To transform the cost of a fruit basket each year, we divide each year’s value by $15.35, the value of the base year, and then multiply the result by 100. The price index is shown in the following table.

2001	2002	2003	2004
69.71	89.90	100.00	106.3

Note that the base year has a value of 100; years before the base year have values less than 100; and years after have values more than 100.

Exercise:

Problem: Compute the inflation rate for fruit prices from 2001 to 2004.

Solution:

The inflation rate is calculated as the percentage change in the price index from year to year. For example, the inflation rate between 2001 and 2002 is (84.61 – 69.71) / 69.71 = 0.2137 = 21.37%. The inflation rates for all the years are shown in the last row of the following table, which includes the two previous answers.

Items	Qty	(2001) Price	(2001) Amount Spent	(2002) Price	(2002) Amount Spent	(2003) Price	(2003) Amount Spent	(200 Price
Apples	10	$0.50	$5.00	$0.75	$7.50	$0.85	$8.50	$0.8
Bananas	12	$0.20	$2.40	$0.25	$3.00	$0.25	$3.00	$0.2
Grapes	2	$0.65	$1.30	$0.70	$1.40	$0.90	$1.80	$0.9
Raspberries	1	$2.00	$2.00	$1.90	$1.90	$2.05	$2.05	$2.1
Total			$10.70		$13.80		$15.35	
Price Index			69.71		84.61		100.00	
Inflation Rate					21.37%		18.19%	

Exercise:

Problem:

Edna is living in a retirement home where most of her needs are taken care of, but she has some discretionary spending. Based on the basket of goods in [link], by what percentage does Edna's cost of living increase between time 1 and time 2?

Items	Quantity	(Time 1) Price	(Time 2) Price
Gifts for grandchildren	12	$50	$60
Pizza delivery	24	$15	$16
Blouses	6	$60	$50
Vacation trips	2	$400	$420

Solution:

Begin by calculating the total cost of buying the basket in each time period, as shown in the following table.

Items	Quantity	(Time 1) Price	(Time 1) Total Cost	(Time 2) Price	(Time 2) Total Cost
Gifts	12	$50	$600	$60	$720
Pizza	24	$15	$360	$16	$384
Blouses	6	$60	$360	$50	$300
Trips	2	$400	$800	$420	$840
Total Cost			$2,120		$2,244

The rise in cost of living is calculated as the percentage increase:

(2244 – 2120) / 2120 = 0.0585 = 5.85%.

Review Questions

Exercise:

Problem: How is a basket of goods and services used to measure the price level?

Exercise:

Problem: Why are index numbers used to measure the price level rather than dollar value of goods?

Exercise:

Problem: What is the difference between the price level and the rate of inflation?

Critical Thinking Question

Exercise:

Problem:

Inflation rates, like most statistics, are imperfect measures. Can you identify some ways that the inflation rate for fruit does not perfectly capture the rising price of fruit?

Problems

Exercise:

Problem:

The index number representing the price level changes from 110 to 115 in one year, and then from 115 to 120 the next year. Since the index number increases by five each year, is five the inflation rate each year? Is the inflation rate the same each year? Explain your answer.

Exercise:

Problem:

The total price of purchasing a basket of goods in the United Kingdom over four years is: year 1=£940, year 2=£970, year 3=£1000, and year 4=£1070. Calculate two price indices, one using year 1 as the base year (set equal to 100) and the other using year 4 as the base year (set equal to 100). Then, calculate the inflation rate based on the first price index. If you had used the other price index, would you get a different inflation rate? If you are unsure, do the calculation and find out.

References

Sources for [link]:
http://www.eia.gov/dnav/pet/pet_pri_gnd_a_epmr_pte_dpgal_w.htm
http://data.bls.gov/cgi-bin/surveymost?ap
http://www.bls.gov/ro3/apmw.htm
http://www.autoblog.com/2014/03/12/who-can-afford-the-average-car-price-only-folks-in-washington/
https://www.census.gov/construction/nrs/pdf/uspricemon.pdf
http://www.bls.gov/news.release/empsit.t24.htm
http://variety.com/2015/film/news/movie-ticket-prices-increased-in-2014-1201409670/

US Inflation Calculator. "Historical Inflation Rates: 1914-2013." Accessed March 4, 2015. http://www.usinflationcalculator.com/inflation/historical-inflation-rates/.

Glossary

base year
: arbitrary year whose value as an index number is defined as 100; inflation from the base year to other years can easily be seen by comparing the index number in the other year to the index number in the base year—for example, 100; so, if the index number for a year is 105, then there has been exactly 5% inflation between that year and the base year

basket of goods and services
: a hypothetical group of different items, with specified quantities of each one meant to represent a “typical” set of consumer purchases, used as a basis for calculating how the price level changes over time

index number
: a unit-free number derived from the price level over a number of years, which makes computing inflation rates easier, since the index number has values around 100

inflation
: a general and ongoing rise in the level of prices in an economy

How Changes in the Cost of Living are Measured

By the end of this section, you will be able to:

- Use the Consumer Price Index (CPI) to calculate U.S. inflation rates
- Identify several ways the Bureau of Labor Statistics avoids baises in the Consumer Price Index (CPI)
- Differentiate among the Consumer Price Index (CPI), the Producer Price Index (PPI), the International Price Index, the Employment Cost Index, and the GDP deflator.

The most commonly cited measure of inflation in the United States is the **Consumer Price Index (CPI)**. The CPI is calculated by government statisticians at the U.S. Bureau of Labor Statistics based on the prices in a fixed basket of goods and services that represents the purchases of the average family of four. In recent years, the statisticians have paid considerable attention to a subtle problem: that the change in the total cost of buying a fixed basket of goods and services over time is conceptually not quite the same as the change in the cost of living, because the cost of living represents how much it costs for a person to feel that his or her consumption provides an equal level of satisfaction or utility.

To understand the distinction, imagine that over the past 10 years, the cost of purchasing a fixed basket of goods increased by 25% and your salary also increased by 25%. Has your personal standard of living held constant? If you do not necessarily purchase an identical fixed basket of goods every year, then an inflation calculation based on the cost of a fixed basket of goods may be a misleading measure of how your cost of living has changed. Two problems arise here: substitution bias and quality/new goods bias.

When the price of a good rises, consumers tend to purchase less of it and to seek out substitutes instead. Conversely, as the price of a good falls, people will tend to purchase more of it. This pattern implies that goods with generally rising prices should tend over time to become less important in the overall basket of goods used to calculate inflation, while goods with falling prices should tend to become more important. Consider, as an example, a rise in the price of peaches by $100 per pound. If consumers

were utterly inflexible in their demand for peaches, this would lead to a big rise in the price of food for consumers. Alternatively, imagine that people are utterly indifferent to whether they have peaches or other types of fruit. Now, if peach prices rise, people completely switch to other fruit choices and the average price of food does not change at all. A fixed and unchanging basket of goods assumes that consumers are locked into buying exactly the same goods, regardless of price changes—not a very likely assumption. Thus, **substitution bias**—the rise in the price of a fixed basket of goods over time—tends to overstate the rise in a consumer's true cost of living, because it does not take into account that the person can substitute away from goods whose relative prices have risen.

The other major problem in using a fixed basket of goods as the basis for calculating inflation is how to deal with the arrival of improved versions of older goods or altogether new goods. Consider the problem that arises if a cereal is improved by adding 12 essential vitamins and minerals—and also if a box of the cereal costs 5% more. It would clearly be misleading to count the entire resulting higher price as inflation, because the new price is being charged for a product of higher (or at least different) quality. Ideally, one would like to know how much of the higher price is due to the quality change, and how much of it is just a higher price. The Bureau of Labor Statistics, which is responsible for the computation of the Consumer Price Index, must deal with these difficulties in adjusting for quality changes.

Note:
Visit this website to view a list of Ford car prices between 1909 and 1927. Consider how these prices compare to today's models. Is the product today of a different quality?



A new product can be thought of as an extreme improvement in quality—from something that did not exist to something that does. However, the basket of goods that was fixed in the past obviously does not include new goods created since then. The basket of goods and services used in the Consumer Price Index (CPI) is revised and updated over time, and so new products are gradually included. But the process takes some time. For example, room air conditioners were widely sold in the early 1950s, but were not introduced into the basket of goods behind the Consumer Price Index until 1964. The VCR and personal computer were available in the late 1970s and widely sold by the early 1980s, but did not enter the CPI basket of goods until 1987. By 1996, there were more than 40 million cellular phone subscribers in the United States—but cell phones were not yet part of the CPI basket of goods. The parade of inventions has continued, with the CPI inevitably lagging a few years behind.

The arrival of new goods creates problems with respect to the accuracy of measuring inflation. The reason people buy new goods, presumably, is that the new goods offer better value for money than existing goods. Thus, if the price index leaves out new goods, it overlooks one of the ways in which the cost of living is improving. In addition, the price of a new good is often higher when it is first introduced and then declines over time. If the new good is not included in the CPI for some years, until its price is already lower, the CPI may miss counting this price decline altogether. Taking these arguments together, the **quality/new goods bias** means that the rise in the price of a fixed basket of goods over time tends to overstate the rise in a consumer's true cost of living, because it does not take into account how improvements in the quality of existing goods or the invention of new goods improves the standard of living. The following Clear It Up feature is a must-read on how the CPI is comprised and calculated.

Note:
How do U.S. government statisticians measure the Consumer Price Index?
When the U.S. Bureau of Labor Statistics (BLS) calculates the Consumer Price Index, the first task is to decide on a basket of goods that is representative of the purchases of the average household. This is done by

using the Consumer Expenditure Survey, a national survey of about 7,000 households, which provides detailed information on spending habits. Consumer expenditures are broken up into eight major groups, shown below, which in turn are broken up into more than 200 individual item categories. The BLS currently uses 1982–1984 as the base period.

For each of the 200 individual expenditure items, the BLS chooses several hundred very specific examples of that item and looks at the prices of those examples. So, in figuring out the "breakfast cereal" item under the overall category of "foods and beverages," the BLS picks several hundred examples of breakfast cereal. One example might be the price of a 24-oz. box of a particular brand of cereal sold at a particular store. The specific products and sizes and stores chosen are statistically selected to reflect what people buy and where they shop. The basket of goods in the Consumer Price Index thus consists of about 80,000 products; that is, several hundred specific products in over 200 broad-item categories. About one-quarter of these 80,000 specific products are rotated out of the sample each year, and replaced with a different set of products.

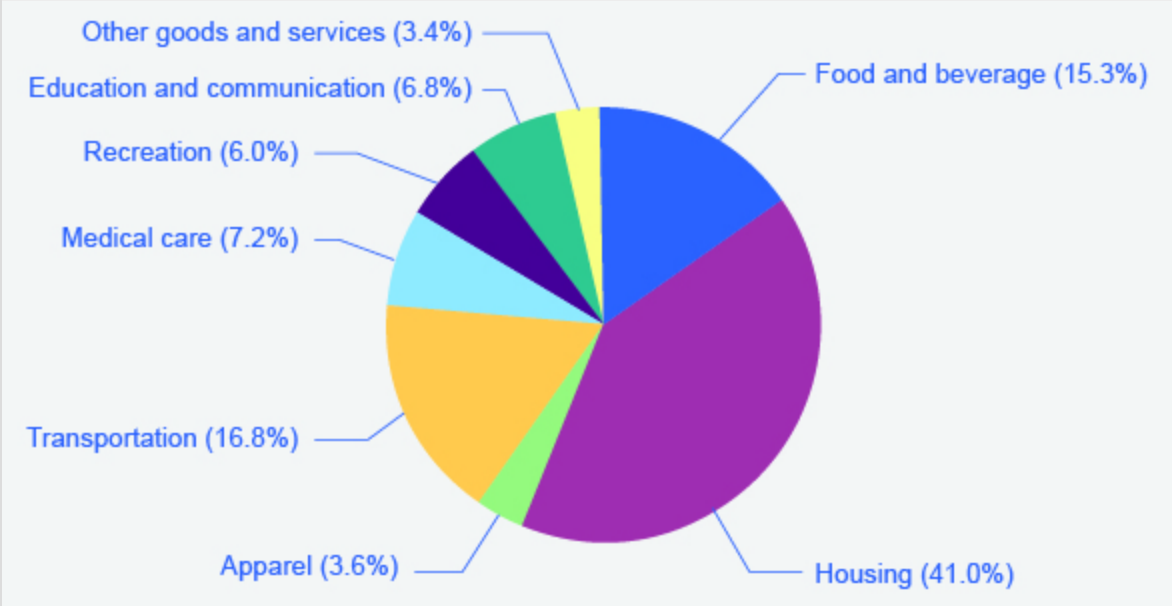
The next step is to collect data on prices. Data collectors visit or call about 23,000 stores in 87 urban areas all over the United States every month to collect prices on these 80,000 specific products. A survey of 50,000 landlords or tenants is also carried out to collect information about rents. The Consumer Price Index is then calculated by taking the 80,000 prices of individual products and combining them, using weights (as shown in [link]) determined by the quantities of these products that people buy and allowing for factors like substitution between goods and quality improvements, into price indices for the 200 or so overall items. Then, the price indices for the 200 items are combined into an overall Consumer Price Index. According the Consumer Price Index website, there are eight categories used by data collectors:

The Eight Major Categories in the Consumer Price Index

1. Food and beverages (breakfast cereal, milk, coffee, chicken, wine, full-service meals, and snacks)
2. Housing (renter's cost of housing, homeowner's cost of housing, fuel oil, bedroom furniture)
3. Apparel (men's shirts and sweaters, women's dresses, jewelry)

4. Transportation (new vehicles, airline fares, gasoline, motor vehicle insurance)
5. Medical care (prescription drugs and medical supplies, physicians' services, eyeglasses and eye care, hospital services)
6. Recreation (televisions, cable television, pets and pet products, sports equipment, admissions)
7. Education and communication (college tuition, postage, telephone services, computer software and accessories)
8. Other goods and services (tobacco and smoking products, haircuts and other personal services, funeral expenses)

The Weighting of CPI Components



Of the eight categories used to generate the Consumer Price Index, housing is the highest at 41%. The next highest category, transportation at 16.8%, is less than half the size of housing. Other goods and services, and apparel, are the lowest at 3.4% and 3.6%, respectively. (Source: www.bls.gov/cpi)

The CPI and Core Inflation Index

Imagine if you were driving a company truck across the country- you probably would care about things like the prices of available roadside food and motel rooms as well as the truck's operating condition. However, the manager of the firm might have different priorities. He would care mostly about the truck's on-time performance and much less so about the food you were eating and the places you were staying. In other words, the company manager would be paying attention to the production of the firm, while ignoring transitory elements that impacted you, but did not affect the company's bottom line.

In a sense, a similar situation occurs with regard to measures of inflation. As we've learned, CPI measures prices as they affect everyday household spending. Well, a **core inflation index** is typically calculated by taking the CPI and excluding volatile economic variables. In this way, economists have a better sense of the underlying trends in prices that affect the cost of living.

Examples of excluded variables include energy and food prices, which can jump around from month to month because of the weather. According to an article by Kent Bernhard, during Hurricane Katrina in 2005, a key supply point for the nation's gasoline was nearly knocked out. Gas prices quickly shot up across the nation, in some places up to 40 cents a gallon in one day. This was not the cause of an economic policy but rather a short-lived event until the pumps were restored in the region. In this case, the CPI that month would register the change as a cost of living event to households, but the core inflation index would remain unchanged. As a result, the Federal Reserve's decisions on interest rates would not be influenced. Similarly, droughts can cause world-wide spikes in food prices that, if temporary, do not affect the nation's economic capability.

As former Chairman of the Federal Reserve Ben Bernanke noted in 1999 about the core inflation index, "It provide(s) a better guide to monetary policy than the other indices, since it measures the more persistent underlying inflation rather than transitory influences on the price level." Bernanke also noted that it helps communicate that every inflationary shock need not be responded to by the Federal Reserve since some price changes are transitory and not part of a structural change in the economy.

In sum, both the CPI and the core inflation index are important, but serve different audiences. The CPI helps households understand their overall cost of living from month to month, while the core inflation index is a preferred gauge from which to make important government policy changes.

Practical Solutions for the Substitution and the Quality/New Goods Biases

By the early 2000s, the Bureau of Labor Statistics was using alternative mathematical methods for calculating the Consumer Price Index, more complicated than just adding up the cost of a fixed basket of goods, to allow for some substitution between goods. It was also updating the basket of goods behind the CPI more frequently, so that new and improved goods could be included more rapidly. For certain products, the BLS was carrying out studies to try to measure the quality improvement. For example, with computers, an economic study can try to adjust for changes in speed, memory, screen size, and other characteristics of the product, and then calculate the change in price after these product changes are taken into account. But these adjustments are inevitably imperfect, and exactly how to make these adjustments is often a source of controversy among professional economists.

By the early 2000s, the substitution bias and quality/new goods bias had been somewhat reduced, so that since then the rise in the CPI probably overstates the true rise in inflation by only about 0.5% per year. Over one or a few years, this is not much; over a period of a decade or two, even half of a percent per year compounds to a more significant amount. In addition, the CPI tracks prices from physical locations, and not at online sites like Amazon, where prices can be lower.

When measuring inflation (and other economic statistics, too), a tradeoff arises between simplicity and interpretation. If the inflation rate is calculated with a basket of goods that is fixed and unchanging, then the calculation of an inflation rate is straightforward, but the problems of substitution bias and quality/new goods bias will arise. However, when the basket of goods is allowed to shift and evolve to reflect substitution toward

lower relative prices, quality improvements, and new goods, the technical details of calculating the inflation rate grow more complex.

Additional Price Indices: PPI, GDP Deflator, and More

The basket of goods behind the Consumer Price Index represents an average hypothetical U.S. household, which is to say that it does not exactly capture anyone's personal experience. When the task is to calculate an average level of inflation, this approach works fine. What if, however, you are concerned about inflation experienced by a certain group, like the elderly, or the poor, or single-parent families with children, or Hispanic-Americans? In specific situations, a price index based on the buying power of the average consumer may not feel quite right.

This problem has a straightforward solution. If the Consumer Price Index does not serve the desired purpose, then invent another index, based on a basket of goods appropriate for the group of interest. Indeed, the Bureau of Labor Statistics publishes a number of experimental price indices: some for particular groups like the elderly or the poor, some for different geographic areas, and some for certain broad categories of goods like food or housing.

The BLS also calculates several price indices that are not based on baskets of consumer goods. For example, the **Producer Price Index (PPI)** is based on prices paid for supplies and inputs by producers of goods and services. It can be broken down into price indices for different industries, commodities, and stages of processing (like finished goods, intermediate goods, crude materials for further processing, and so on). There is an **International Price Index** based on the prices of merchandise that is exported or imported. An **Employment Cost Index** measures wage inflation in the labor market. The **GDP deflator**, measured by the Bureau of Economic Analysis, is a price index that includes all the components of GDP (that is, consumption plus investment plus government plus exports minus imports). Unlike the CPI, its baskets are not fixed but re-calculate what that year's GDP would have been worth using the base-year's prices. MIT's Billion Prices Project is a more recent alternative attempt to measure prices: data are collected online from retailers and then composed into an index that is compared to the CPI (Source: http://bpp.mit.edu/usa/).

What’s the best measure of inflation? If concerned with the most accurate measure of inflation, use the GDP deflator as it picks up the prices of goods and services produced. However, it is not a good measure of cost of living as it includes prices of many products not purchased by households (for example, aircraft, fire engines, factory buildings, office complexes, and bulldozers). If one wants the most accurate measure of inflation as it impacts households, use the CPI, as it only picks up prices of products purchased by households. That is why the CPI is sometimes referred to as the cost-of-living index. As the Bureau of Labor Statistics states on its website: “The ‘best’ measure of inflation for a given application depends on the intended use of the data.”

Key Concepts and Summary

Measuring price levels with a fixed basket of goods will always have two problems: the substitution bias, by which a fixed basket of goods does not allow for buying more of what is relatively less expensive and less of what is relatively more expensive; and the quality/new goods bias, by which a fixed basket cannot take into account improvements in quality and the advent of new goods. These problems can be reduced in degree—for example, by allowing the basket of goods to evolve over time—but they cannot be totally eliminated. The most commonly cited measure of inflation is the Consumer Price Index (CPI), which is based on a basket of goods representing what the typical consumer buys. The Core Inflation Index further breaks down the CPI by excluding volatile economic variables. Several price indices are not based on baskets of consumer goods. The GDP deflator is based on all the components of GDP. The Producer Price Index is based on prices of supplies and inputs bought by producers of goods and services. An Employment Cost Index measures wage inflation in the labor market. An International Price Index is based on the prices of merchandise that is exported or imported.

Self-Check Questions

Exercise:

Problem:

How Changes in the Cost of Living are Measured introduced a number of different price indices. Which price index would be best to use to adjust your paycheck for inflation?

Solution:

Since the CPI measures the prices of the goods and services purchased by the typical urban consumer, it measures the prices of things that people buy with their paycheck. For that reason, the CPI would be the best price index to use for this purpose.

Exercise:

Problem:

The Consumer Price Index is subject to the substitution bias and the quality/new goods bias. Are the Producer Price Index and the GDP Deflator also subject to these biases? Why or why not?

Solution:

The PPI is subject to those biases for essentially the same reasons as the CPI is. The GDP deflator picks up prices of what is actually purchased that year, so there are no biases. That is the advantage of using the GDP deflator over the CPI.

Review Questions

Exercise:

Problem:

Why does “substitution bias” arise if the inflation rate is calculated based on a fixed basket of goods?

Exercise:

Problem:

Why does the “quality/new goods bias” arise if the inflation rate is calculated based on a fixed basket of goods?

Critical Thinking Question

Exercise:

Problem:

Given the federal budget deficit in recent years, some economists have argued that by adjusting Social Security payments for inflation using the CPI, Social Security is overpaying recipients. What is the argument being made, and do you agree or disagree with it?

Exercise:

Problem:

Why is the GDP deflator not an accurate measure of inflation as it impacts a household?

Exercise:

Problem:

Imagine that the government statisticians who calculate the inflation rate have been updating the basic basket of goods once every 10 years, but now they decide to update it every five years. How will this change affect the amount of substitution bias and quality/new goods bias?

Exercise:

Problem:

Describe a situation, either a government policy situation, an economic problem, or a private sector situation, where using the CPI to convert from nominal to real would be more appropriate than using the GDP deflator.

Exercise:

Problem:

Describe a situation, either a government policy situation, an economic problem, or a private sector situation, where using the GDP deflator to convert from nominal to real would be more appropriate than using the CPI.

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Glossary

Consumer Price Index (CPI)
: a measure of inflation calculated by U.S. government statisticians based on the price level from a fixed basket of goods and services that represents the purchases of the average consumer

core inflation index
: a measure of inflation typically calculated by taking the CPI and excluding volatile economic variables such as food and energy prices to better measure the underlying and persistent trend in long-term prices

Employment Cost Index
: a measure of inflation based on wages paid in the labor market

GDP deflator

a measure of inflation based on the prices of all the components of GDP

International Price Index
: a measure of inflation based on the prices of merchandise that is exported or imported

Producer Price Index (PPI)
: a measure of inflation based on prices paid for supplies and inputs by producers of goods and services

quality/new goods bias
: inflation calculated using a fixed basket of goods over time tends to overstate the true rise in cost of living, because it does not take into account improvements in the quality of existing goods or the invention of new goods

substitution bias
: an inflation rate calculated using a fixed basket of goods over time tends to overstate the true rise in the cost of living, because it does not take into account that the person can substitute away from goods whose prices rise by a lot

Introduction to Money and Banking
class="introduction"
Cowrie Shell or Money?

Is this an image of a cowrie shell or money? The answer is: Both. For centuries, the extremely durable cowrie shell was used as a medium of exchange in various parts of the world. (Credit: modification of work by “prilfish”/Flickr Creative Commons)



Note:

The Many Disguises of Money: From Cowries to Bitcoins

Here is a trivia question: In the history of the world, what item was used for money over the broadest geographic area and for the longest period of time? The answer is not gold, silver, or any precious metal. It is the cowrie, a mollusk shell found mainly off the Maldives Islands in the Indian Ocean. Cowries served as money as early as 700 B.C. in China. By the 1500s, they were in widespread use across India and Africa. For several centuries after that, cowries were used in markets including southern Europe, western Africa, India, and China for a wide range of purchases: everything from buying lunch or a ferry ride to paying for a shipload of silk or rice. Cowries were still acceptable as a way of paying taxes in certain African nations in the early twentieth century.

What made cowries work so well as money? First, they are extremely durable—lasting a century or more. As the late economic historian Karl Polyani put it, they can be “poured, sacked, shoveled, hoarded in heaps” while remaining “clean, dainty, stainless, polished, and milk-white.” Second, parties could use cowries either by counting shells of a certain

size, or—for large purchases—by measuring the weight or volume of the total shells to be exchanged. Third, it was impossible to counterfeit a cowrie shell, but gold or silver coins could be counterfeited by making copies with cheaper metals. Finally, in the heyday of cowrie money, from the 1500s into the 1800s, the collection of cowries was tightly controlled, first by the Portuguese and later by the Dutch and the English. As a result, the supply of cowries was allowed to grow quickly enough to serve the needs of commerce, but not so quickly that they were no longer scarce. Money throughout the ages has taken many different forms and continues to evolve even today. What do you think money is?

Note:
Introduction to Money and Banking
In this chapter, you will learn about:

- Defining Money by Its Functions
- Measuring Money: Currency, M1, and M2
- The Role of Banks
- How Banks Create Money

The discussion of money and banking is a central component in the study of macroeconomics. At this point, you should have firmly in mind the main goals of macroeconomics from Welcome to Economics!: economic growth, low unemployment, and low inflation. We have yet to discuss money and its role in helping to achieve our macroeconomic goals.

You should also understand Keynesian and neoclassical frameworks for macroeconomic analysis and how these frameworks can be embodied in the aggregate demand/aggregate supply (AD/AS) model. With the goals and frameworks for macroeconomic analysis in mind, the final step is to discuss the two main categories of macroeconomic policy: monetary policy, which focuses on money, banking and interest rates; and fiscal policy, which focuses on government spending, taxes, and borrowing. This chapter

discusses what economists mean by money, and how money is closely interrelated with the banking system. Monetary Policy and Bank Regulation furthers this discussion.

Defining Money by Its Functions

By the end of this section, you will be able to:

- Explain the various functions of money
- Contrast commodity money and fiat money

Money for the sake of money is not an end in itself. You cannot eat dollar bills or wear your bank account. Ultimately, the usefulness of money rests in exchanging it for goods or services. As the American writer and humorist Ambrose Bierce (1842–1914) wrote in 1911, money is a "blessing that is of no advantage to us excepting when we part with it." Money is what people regularly use when purchasing or selling goods and services, and thus money must be widely accepted by both buyers and sellers. This concept of money is intentionally flexible, because money has taken a wide variety of forms in different cultures.

Barter and the Double Coincidence of Wants

To understand the usefulness of money, we must consider what the world would be like without money. How would people exchange goods and services? Economies without money typically engage in the barter system. **Barter**—literally trading one good or service for another—is highly inefficient for trying to coordinate the trades in a modern advanced economy. In an economy without money, an exchange between two people would involve a **double coincidence of wants**, a situation in which two people each want some good or service that the other person can provide. For example, if an accountant wants a pair of shoes, this accountant must find someone who has a pair of shoes in the correct size and who is willing to exchange the shoes for some hours of accounting services. Such a trade is likely to be difficult to arrange. Think about the complexity of such trades in a modern economy, with its extensive division of labor that involves thousands upon thousands of different jobs and goods.

Another problem with the barter system is that it does not allow us to easily enter into future contracts for the purchase of many goods and services. For example, if the goods are perishable it may be difficult to exchange them

for other goods in the future. Imagine a farmer wanting to buy a tractor in six months using a fresh crop of strawberries. Additionally, while the barter system might work adequately in small economies, it will keep these economies from growing. The time that individuals would otherwise spend producing goods and services and enjoying leisure time is spent bartering.

Functions for Money

Money solves the problems created by the barter system. (We will get to its definition soon.) First, money serves as a **medium of exchange**, which means that money acts as an intermediary between the buyer and the seller. Instead of exchanging accounting services for shoes, the accountant now exchanges accounting services for money. This money is then used to buy shoes. To serve as a medium of exchange, money must be very widely accepted as a method of payment in the markets for goods, labor, and financial capital.

Second, money must serve as a **store of value**. In a barter system, we saw the example of the shoemaker trading shoes for accounting services. But she risks having her shoes go out of style, especially if she keeps them in a warehouse for future use—their value will decrease with each season. Shoes are not a good store of value. Holding money is a much easier way of storing value. You know that you do not need to spend it immediately because it will still hold its value the next day, or the next year. This function of money does not require that money is a *perfect* store of value. In an economy with inflation, money loses some buying power each year, but it remains money.

Third, money serves as a **unit of account**, which means that it is the ruler by which other values are measured. For example, an accountant may charge $100 to file your tax return. That $100 can purchase two pair of shoes at $50 a pair. Money acts as a common denominator, an accounting method that simplifies thinking about trade-offs.

Finally, another function of money is that money must serve as a **standard of deferred payment**. This means that if money is usable today to make purchases, it must also be acceptable to make purchases today that will be

paid in the *future*. Loans and future agreements are stated in monetary terms and the standard of deferred payment is what allows us to buy goods and services today and pay in the future. So **money** serves all of these functions — it is a medium of exchange, store of value, unit of account, and standard of deferred payment.

Commodity versus Fiat Money

Money has taken a wide variety of forms in different cultures. Gold, silver, cowrie shells, cigarettes, and even cocoa beans have been used as money. Although these items are used as **commodity money**, they also have a value from use as something other than money. Gold, for example, has been used throughout the ages as money although today it is not used as money but rather is valued for its other attributes. Gold is a good conductor of electricity and is used in the electronics and aerospace industry. Gold is also used in the manufacturing of energy efficient reflective glass for skyscrapers and is used in the medical industry as well. Of course, gold also has value because of its beauty and malleability in the creation of jewelry.

As commodity money, gold has historically served its purpose as a medium of exchange, a store of value, and as a unit of account. **Commodity-backed currencies** are dollar bills or other currencies with values backed up by gold or other commodity held at a bank. During much of its history, the money supply in the United States was backed by gold and silver. Interestingly, antique dollars dated as late as 1957, have “Silver Certificate” printed over the portrait of George Washington, as shown in [link]. This meant that the holder could take the bill to the appropriate bank and exchange it for a dollar’s worth of silver.
A Silver Certificate and a Modern U.S. Bill



Until 1958, silver certificates were commodity-backed money—backed by silver, as indicated by the words “Silver Certificate” printed on the bill. Today, U.S. bills are backed by the Federal Reserve, but as fiat money. (Credit: “The.Comedian”/Flickr Creative Commons)

As economies grew and became more global in nature, the use of commodity monies became more cumbersome. Countries moved towards the use of **fiat money**. Fiat money has no intrinsic value, but is declared by a government to be the legal tender of a country. The United States’ paper money, for example, carries the statement: “THIS NOTE IS LEGAL TENDER FOR ALL DEBTS, PUBLIC AND PRIVATE.” In other words, by government decree, if you owe a debt, then legally speaking, you can pay that debt with the U.S. currency, even though it is not backed by a commodity. The only backing of our money is universal faith and trust that the currency has value, and nothing more.

Note:
Watch this video on the “History of Money.”



Key Concepts and Summary

Money is what people in a society regularly use when purchasing or selling goods and services. If money were not available, people would need to barter with each other, meaning that each person would need to identify others with whom they have a double coincidence of wants—that is, each party has a specific good or service that the other desires. Money serves several functions: a medium of exchange, a unit of account, a store of value, and a standard of deferred payment. There are two types of money: commodity money, which is an item used as money, but which also has value from its use as something other than money; and fiat money, which has no intrinsic value, but is declared by a government to be the legal tender of a country.

Self-Check Questions

Exercise:

Problem:

In many casinos, a person buys chips to use for gambling. Within the walls of the casino, these chips can often be used to buy food and drink or even a hotel room. Do chips in a gambling casino serve all three functions of money?

Solution:

As long as you remain within the walls of the casino, chips fit the definition of money; that is, they serve as a medium of exchange, a unit of account, and a store of value. Chips do not work very well as money once you leave the casino, but many kinds of money do not work well in other areas. For example, it is hard to spend money from Turkey or Brazil at your local supermarket or at the movie theater.

Exercise:

Problem:

Can you name some item that is a store of value, but does not serve the other functions of money?

Solution:

Many physical items that a person buys at one time but may sell at another time can serve as an answer to this question. Examples include a house, land, art, rare coins or stamps, and so on.

Review Questions

Exercise:

Problem: What are the four functions served by money?

Exercise:

Problem:

How does the existence of money simplify the process of buying and selling?

Exercise:

Problem: What is the double-coincidence of wants?

Critical Thinking Questions

Exercise:

Problem:

The Bring it Home Feature discusses the use of cowrie shells as money. Although cowrie shells are no longer used as money, do you think other forms of commodity monies are possible? What role might technology play in our definition of money?

Exercise:

Problem:

Imagine that you are a barber in a world without money. Explain why it would be tricky to obtain groceries, clothing, and a place to live.

References

Hogendorn, Jan and Marion Johnson. *The Shell Money of the Slave Trade*. Cambridge University Press, 2003. 6.

Glossary

barter
: literally, trading one good or service for another, without using money

commodity money
: an item that is used as money, but which also has value from its use as something other than money

commodity-backed currencies
: are dollar bills or other currencies with values backed up by gold or another commodity

double coincidence of wants

a situation in which two people each want some good or service that the other person can provide

fiat money
: has no intrinsic value, but is declared by a government to be the legal tender of a country

medium of exchange
: whatever is widely accepted as a method of payment

money
: whatever serves society in four functions: as a medium of exchange, a store of value, a unit of account, and a standard of deferred payment.

standard of deferred payment
: money must also be acceptable to make purchases today that will be paid in the future

store of value
: something that serves as a way of preserving economic value that can be spent or consumed in the future

unit of account
: the common way in which market values are measured in an economy

Measuring Money: Currency, M1, and M2

By the end of this section, you will be able to:

- Contrast M1 money supply and M2 money supply
- Classify monies as M1 money supply or M2 money supply

Cash in your pocket certainly serves as money. But what about checks or credit cards? Are they money, too? Rather than trying to state a single way of measuring money, economists offer broader definitions of money based on liquidity. Liquidity refers to how quickly a financial asset can be used to buy a good or service. For example, cash is very liquid. Your $10 bill can be easily used to buy a hamburger at lunchtime. However, $10 that you have in your savings account is not so easy to use. You must go to the bank or ATM machine and withdraw that cash to buy your lunch. Thus, $10 in your savings account is *less* liquid.

The Federal Reserve Bank, which is the central bank of the United States, is a bank regulator and is responsible for monetary policy and defines money according to its liquidity. There are two definitions of money: M1 and M2 money supply. **M1 money supply** includes those monies that are very liquid such as cash, checkable (demand) deposits, and traveler's checks **M2 money supply** is less liquid in nature and includes M1 plus savings and time deposits, certificates of deposits, and money market funds.

M1 money supply includes **coins and currency in circulation**—the coins and bills that circulate in an economy that are not held by the U.S. Treasury, at the Federal Reserve Bank, or in bank vaults. Closely related to currency are checkable deposits, also known as **demand deposits**. These are the amounts held in checking accounts. They are called demand deposits or checkable deposits because the banking institution must give the deposit holder his money "on demand" when a check is written or a debit card is used. These items together—currency, and checking accounts in banks—make up the definition of money known as M1, which is measured daily by the Federal Reserve System. Traveler's checks are a also included in M1, but have decreased in use over the recent past.

A broader definition of money, M2 includes everything in M1 but also adds other types of deposits. For example, M2 includes **savings deposits** in banks, which are bank accounts on which you cannot write a check directly, but from which you can easily withdraw the money at an automatic teller machine or bank. Many banks and other financial institutions also offer a chance to invest in **money market funds**, where the deposits of many individual investors are pooled together and invested in a safe way, such as short-term government bonds. Another ingredient of M2 are the relatively small (that is, less than about $100,000) certificates of deposit (CDs) or **time deposits**, which are accounts that the depositor has committed to leaving in the bank for a certain period of time, ranging from a few months to a few years, in exchange for a higher interest rate. In short, all these types of M2 are money that you can withdraw and spend, but which require a greater effort to do so than the items in M1 [link] should help in visualizing the relationship between M1 and M2. Note that M1 is included in the M2 calculation.

The Relationship between M1 and M2 Money



M1 and M2 money have several definitions, ranging from narrow to broad. M1 = coins and currency in circulation + checkable (demand) deposit + traveler’s

checks. M2 = M1 + savings deposits + money market funds + certificates of deposit + other time deposits.

The Federal Reserve System is responsible for tracking the amounts of M1 and M2 and prepares a weekly release of information about the money supply. To provide an idea of what these amounts sound like, according to the Federal Reserve Bank's measure of the U.S. money stock, at the end of February 2015, M1 in the United States was $3 trillion, while M2 was $11.8 trillion. A breakdown of the portion of each type of money that comprised M1 and M2 in February 2015, as provided by the Federal Reserve Bank, is provided in [link].

Components of M1 in the U.S. (February 2015, Seasonally Adjusted)	**$ billions**
Currency	$1,271.8
Traveler's checks	$2.9
Demand deposits and other checking accounts	$1,713.5
Total M1	*$2,988.2 (or $3 trillion)*
Components of M2 in the U.S. (February 2015, Seasonally Adjusted)	**$ billions**
M1 money supply	$2,988.2

Savings accounts	$7,712.1
Time deposits	$509.2
Individual money market mutual fund balances	$610.8
Total M2	*$11,820.3 (or $11.8 trillion)*

M1 and M2 Federal Reserve Statistical Release, Money Stock Measures(Source: Federal Reserve Statistical Release, http://www.federalreserve.gov/RELEASES/h6/current/default.htm#t2tg1link)

The lines separating M1 and M2 can become a little blurry. Sometimes elements of M1 are not treated alike; for example, some businesses will not accept personal checks for large amounts, but will accept traveler's checks or cash. Changes in banking practices and technology have made the savings accounts in M2 more similar to the checking accounts in M1. For example, some savings accounts will allow depositors to write checks, use automatic teller machines, and pay bills over the Internet, which has made it easier to access savings accounts. As with many other economic terms and statistics, the important point is to know the strengths and limitations of the various definitions of money, not to believe that such definitions are as clear-cut to economists as, say, the definition of nitrogen is to chemists.

Where does "plastic money" like debit cards, credit cards, and smart money fit into this picture? A **debit card**, like a check, is an instruction to the user's bank to transfer money directly and immediately from your bank account to the seller. It is important to note that in our definition of money, it is*checkable deposits* that are money, not the paper check or the debit card. Although you can make a purchase with a **credit card**, it is not considered money but rather a short term loan from the credit card company to you. When you make a purchase with a credit card, the credit card company immediately transfers money from its checking account to the seller, and at the end of the month, the credit card company sends you a bill for what you have charged that month. Until you pay the credit card bill, you have effectively borrowed money from the credit card company. With a **smart**

card, you can store a certain value of money on the card and then use the card to make purchases. Some “smart cards” used for specific purposes, like long-distance phone calls or making purchases at a campus bookstore and cafeteria, are not really all that smart, because they can only be used for certain purchases or in certain places.

In short, credit cards, debit cards, and smart cards are different ways to move money when a purchase is made. But having more credit cards or debit cards does not change the quantity of money in the economy, any more than having more checks printed increases the amount of money in your checking account.

One key message underlying this discussion of M1 and M2 is that money in a modern economy is not just paper bills and coins; instead, money is closely linked to bank accounts. Indeed, the macroeconomic policies concerning money are largely conducted through the banking system. The next section explains how banks function and how a nation’s banking system has the power to create money.

Note:
Read a brief article on the current monetary challenges in Sweden.



Key Concepts and Summary

Money is measured with several definitions: M1 includes currency and money in checking accounts (demand deposits). Traveler’s checks are also a component of M1, but are declining in use. M2 includes all of M1, plus

savings deposits, time deposits like certificates of deposit, and money market funds.

Self-Check Questions

Exercise:

Problem:

If you are out shopping for clothes and books, what is easiest and most convenient for you to spend: M1 or M2? Explain your answer.

Solution:

The currency and checks in M1 are easiest to spend. It is harder to spend M2 directly, although if there is an automatic teller machine in the shopping mall, you can turn M2 from your savings account into an M1 of currency quite quickly. If your answer is about "credit cards," then you are really talking about spending M1—although it is M1 from the account of the credit card company, which you will repay later when you credit card bill comes due.

Exercise:

Problem:

For the following list of items, indicate if they are in M1, M2, or neither:

a. Your $5,000 line of credit on your Bank of America card
b. $50 dollars' worth of traveler's checks you have not used yet
c. $1 in quarters in your pocket
d. $1200 in your checking account
e. $2000 you have in a money market account

Solution:

a. Neither in M1 or M2

b. That is part of M1, and because M2 includes M1 it is also part of M2
c. Currency out in the public hands is part of M1 and M2
d. Checking deposits are in M1 and M2
e. Money market accounts are in M2

Review Questions

Exercise:

Problem: What components of money are counted as part of M1?

Exercise:

Problem: What components of money are counted in M2?

Critical Thinking Questions

Exercise:

Problem:

Explain why you think the Federal Reserve Bank tracks M1 and M2.

Exercise:

Problem:

The total amount of U.S. currency in circulation divided by the U.S. population comes out to about $3,500 per person. That is more than most of us carry. Where is all the cash?

Exercise:

Problem:

If you take $100 out of your piggy bank and deposit it in your checking account, how did M1 change? Did M2 change?

References

Federal Reserve Statistical Release. November 23, 2013. http://www.federalreserve.gov/RELEASES/h6/current/default.htm#t2tg1link .

Glossary

coins and currency in circulation
: the coins and bills that circulate in an economy that are not held by the U.S Treasury, at the Federal Reserve Bank, or in bank vaults

credit card
: immediately transfers money from the credit card company's checking account to the seller, and at the end of the month the user owes the money to the credit card company; a credit card is a short-term loan

debit card
: like a check, is an instruction to the user's bank to transfer money directly and immediately from your bank account to the seller

demand deposit
: checkable deposit in banks that is available by making a cash withdrawal or writing a check

M1 money supply
: a narrow definition of the money supply that includes currency and checking accounts in banks, and to a lesser degree, traveler's checks.

M2 money supply
: a definition of the money supply that includes everything in M1, but also adds savings deposits, money market funds, and certificates of deposit

money market fund
: the deposits of many investors are pooled together and invested in a safe way like short-term government bonds

savings deposit
: bank account where you cannot withdraw money by writing a check, but can withdraw the money at a bank—or can transfer it easily to a checking account

smart card
: stores a certain value of money on a card and then the card can be used to make purchases

time deposit
: account that the depositor has committed to leaving in the bank for a certain period of time, in exchange for a higher rate of interest; also called certificate of deposit

The Role of Banks

By the end of this section, you will be able to:

- Explain how banks act as intermediaries between savers and borrowers
- Evaluate the relationship between banks, savings and loans, and credit unions
- Analyze the causes of bankruptcy and recessions

The late bank robber named Willie Sutton was once asked why he robbed banks. He answered: “That’s where the money is.” While this may have been true at one time, from the perspective of modern economists, Sutton is both right and wrong. He is wrong because the overwhelming majority of money in the economy is not in the form of currency sitting in vaults or drawers at banks, waiting for a robber to appear. Most money is in the form of bank accounts, which exist only as electronic records on computers. From a broader perspective, however, the bank robber was more right than he may have known. Banking is intimately interconnected with money and consequently, with the broader economy.

Banks make it far easier for a complex economy to carry out the extraordinary range of transactions that occur in goods, labor, and financial capital markets. Imagine for a moment what the economy would be like if all payments had to be made in cash. When shopping for a large purchase or going on vacation you might need to carry hundreds of dollars in a pocket or purse. Even small businesses would need stockpiles of cash to pay workers and to purchase supplies. A bank allows people and businesses to store this money in either a checking account or savings account, for example, and then withdraw this money as needed through the use of a direct withdrawal, writing a check, or using a debit card.

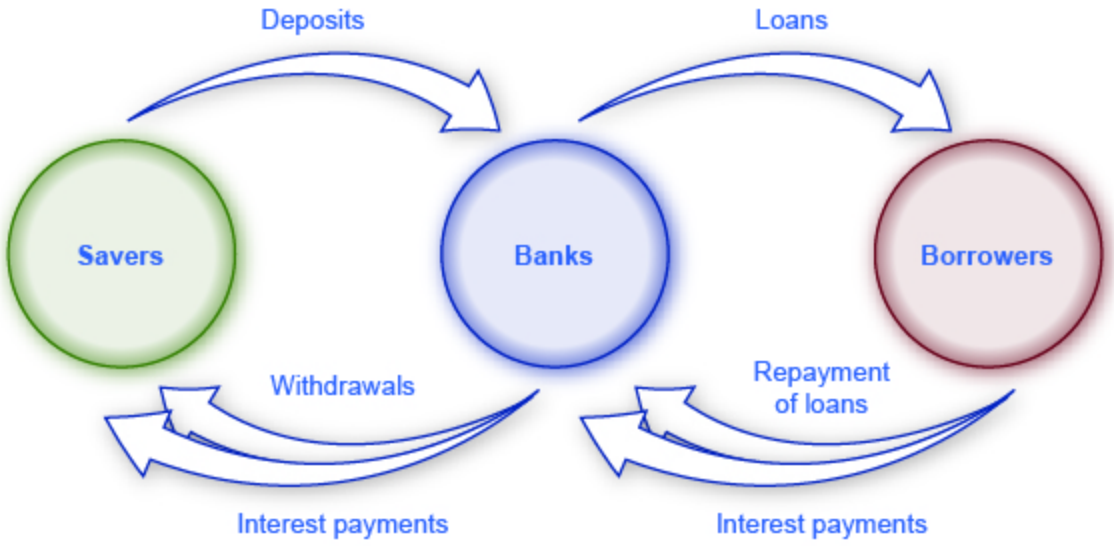
Banks are a critical intermediary in what is called the **payment system**, which helps an economy exchange goods and services for money or other financial assets. Also, those with extra money that they would like to save can store their money in a bank rather than look for an individual that is willing to borrow it from them and then repay them at a later date. Those who want to borrow money can go directly to a bank rather than trying to find someone to lend them cash **Transaction costs** are the costs associated

with finding a lender or a borrower for this money. Thus, banks lower transactions costs and act as financial intermediaries—they bring savers and borrowers together. Along with making transactions much safer and easier, banks also play a key role in the creation of money.

Banks as Financial Intermediaries

An "intermediary" is one who stands between two other parties. Banks are a **financial intermediary**—that is, an institution that operates between a saver who deposits money in a bank and a borrower who receives a loan from that bank. Financial intermediaries include other institutions in the financial market such as insurance companies and pension funds, but they will not be included in this discussion because they are not considered to be **depository institutions**, which are institutions that accept money *deposits* and then use these to make loans. All the funds deposited are mingled in one big pool, which is then loaned out. [link] illustrates the position of banks as financial intermediaries, with deposits flowing into a bank and loans flowing out. Of course, when banks make loans to firms, the banks will try to funnel financial capital to healthy businesses that have good prospects for repaying the loans, not to firms that are suffering losses and may be unable to repay.

Banks as Financial Intermediaries



Banks act as financial intermediaries because they stand between

savers and borrowers. Savers place deposits with banks, and then receive interest payments and withdraw money. Borrowers receive loans from banks and repay the loans with interest. In turn, banks return money to savers in the form of withdrawals, which also include interest payments from banks to savers.

Note:

How are banks, savings and loans, and credit unions related?

Banks have a couple of close cousins: savings institutions and credit unions. Banks, as explained, receive deposits from individuals and businesses and make loans with the money. Savings institutions are also sometimes called “savings and loans” or “thrifts.” They also take loans and make deposits. However, from the 1930s until the 1980s, federal law limited how much interest savings institutions were allowed to pay to depositors. They were also required to make most of their loans in the form of housing-related loans, either to homebuyers or to real-estate developers and builders.

A credit union is a nonprofit financial institution that its members own and run. Members of each credit union decide who is eligible to be a member. Usually, potential members would be everyone in a certain community, or groups of employees, or members of a certain organization. The credit union accepts deposits from members and focuses on making loans back to its members. While there are more credit unions than banks and more banks than savings and loans, the total assets of credit unions are growing. In 2008, there were 7,085 banks. Due to the bank failures of 2007–2009 and bank mergers, there were 5,571 banks in the United States at the end of the fourth quarter in 2014. According to the Credit Union National Association, as of December 2014 there were 6,535 credit unions with assets totaling $1.1 billion. A day of “Transfer Your Money” took place in 2009 out of general public disgust with big bank bailouts. People were encouraged to transfer their deposits to credit unions. This has grown into the ongoing Move Your Money Project. Consequently, some now hold deposits as large as $50 billion. However, as of 2013, the 12 largest banks

(0.2%) controlled 69 percent of all banking assets, according to the Dallas Federal Reserve.

A Bank's Balance Sheet

A **balance sheet** is an accounting tool that lists assets and liabilities. An **asset** is something of value that is owned and can be used to produce something. For example, the cash you own can be used to pay your tuition. If you own a home, this is also considered an asset. A **liability** is a debt or something you owe. Many people borrow money to buy homes. In this case, a home is the asset, but the mortgage is the liability. The **net worth** is the asset value minus how much is owed (the liability). A bank's balance sheet operates in much the same way. A bank's net worth is also referred to as **bank capital**. A bank has assets such as cash held in its vaults, monies that the bank holds at the Federal Reserve bank (called "reserves"), loans that are made to customers, and bonds.

[link] illustrates a hypothetical and simplified balance sheet for the Safe and Secure Bank. Because of the two-column format of the balance sheet, with the T-shape formed by the vertical line down the middle and the horizontal line under "Assets" and "Liabilities," it is sometimes called a **T-account**.

A Balance Sheet for the Safe and Secure Bank

Assets		Liabilities + Net Worth	
Loans	$5 million	Deposits	$10 million
U.S. Government Securities (USGS)	$4 million		
Reserves	$2 million	Net Worth	$1 million

The "T" in a T-account separates the assets of a firm, on the left, from its liabilities, on the right. All firms use T-accounts, though most are much more complex. For a bank, the assets are the financial instruments that either the bank is holding (its reserves) or those instruments where other parties owe money to the bank—like loans made by the bank and U.S. Government Securities, such as U.S. treasury bonds purchased by the bank. Liabilities are what the bank owes to others. Specifically, the bank owes any deposits made in the bank to those who have made them. The net worth of the bank is the total assets minus total liabilities. Net worth is included

on the liabilities side to have the T account balance to zero. For a healthy business, net worth will be positive. For a bankrupt firm, net worth will be negative. In either case, on a bank's T-account, assets will always equal liabilities plus net worth.

When bank customers deposit money into a checking account, savings account, or a certificate of deposit, the bank views these deposits as liabilities. After all, the bank owes these deposits to its customers, when the customers wish to withdraw their money. In the example shown in [link], the Safe and Secure Bank holds $10 million in deposits.

Loans are the first category of bank assets shown in [link]. Say that a family takes out a 30-year mortgage loan to purchase a house, which means that the borrower will repay the loan over the next 30 years. This loan is clearly an asset from the bank's perspective, because the borrower has a legal obligation to make payments to the bank over time. But in practical terms, how can the value of the mortgage loan that is being paid over 30 years be measured in the present? One way of measuring the value of something—whether a loan or anything else—is by estimating what another party in the market is willing to pay for it. Many banks issue home loans, and charge various handling and processing fees for doing so, but then sell the loans to other banks or financial institutions who collect the loan payments. The market where loans are made to borrowers is called the primary loan market, while the market in which these loans are bought and sold by financial institutions is the secondary loan market.

One key factor that affects what financial institutions are willing to pay for a loan, when they buy it in the secondary loan market, is the perceived riskiness of the loan: that is, given the characteristics of the borrower, such as income level and whether the local economy is performing strongly, what proportion of loans of this type will be repaid? The greater the risk that a loan will not be repaid, the less that any financial institution will pay to acquire the loan. Another key factor is to compare the interest rate charged on the original loan with the current interest rate in the economy. If the original loan made at some point in the past requires the borrower to pay a low interest rate, but current interest rates are relatively high, then a financial institution will pay less to acquire the loan. In contrast, if the

original loan requires the borrower to pay a high interest rate, while current interest rates are relatively low, then a financial institution will pay more to acquire the loan. For the Safe and Secure Bank in this example, the total value of its loans if they were sold to other financial institutions in the secondary market is $5 million.

The second category of bank asset is bonds, which are a common mechanism for borrowing, used by the federal and local government, and also private companies, and nonprofit organizations. A bank takes some of the money it has received in deposits and uses the money to buy bonds—typically bonds issued by the U.S. government. Government bonds are low-risk because the government is virtually certain to pay off the bond, albeit at a low rate of interest. These bonds are an asset for banks in the same way that loans are an asset: The bank will receive a stream of payments in the future. In our example, the Safe and Secure Bank holds bonds worth a total value of $4 million.

The final entry under assets is **reserves**, which is money that the bank keeps on hand, and that is not loaned out or invested in bonds—and thus does not lead to interest payments. The Federal Reserve requires that banks keep a certain percentage of depositors' money on "reserve," which means either in their vaults or kept at the Federal Reserve Bank. This is called a reserve requirement. (Monetary Policy and Bank Regulation will explain how the level of these required reserves are one policy tool that governments have to influence bank behavior.) Additionally, banks may also want to keep a certain amount of reserves on hand in excess of what is required. The Safe and Secure Bank is holding $2 million in reserves.

The net worth of a bank is defined as its total assets minus its total liabilities. For the Safe and Secure Bank shown in [link], net worth is equal to $1 million; that is, $11 million in assets minus $10 million in liabilities. For a financially healthy bank, the net worth will be positive. If a bank has negative net worth and depositors tried to withdraw their money, the bank would not be able to give all depositors their money.

Note:

For some concrete examples of what banks do, watch this video from Paul Solman's "Making Sense of Financial News."



How Banks Go Bankrupt

A bank that is bankrupt will have a negative net worth, meaning its assets will be worth less than its liabilities. How can this happen? Again, looking at the balance sheet helps to explain.

A well-run bank will assume that a small percentage of borrowers will not repay their loans on time, or at all, and factor these missing payments into its planning. Remember, the calculations of the expenses of banks every year includes a factor for loans that are not repaid, and the value of a bank's loans on its balance sheet assumes a certain level of riskiness because some loans will not be repaid. Even if a bank expects a certain number of loan defaults, it will suffer if the number of loan defaults is much greater than expected, as can happen during a recession. For example, if the Safe and Secure Bank in [link] experienced a wave of unexpected defaults, so that its loans declined in value from $5 million to $3 million, then the assets of the Safe and Secure Bank would decline so that the bank had negative net worth.

Note:
What led to the financial crisis of 2008–2009?
Many banks make mortgage loans so that people can buy a home, but then do not keep the loans on their books as an asset. Instead, the bank sells the

loan. These loans are “securitized,” which means that they are bundled together into a financial security that is sold to investors. Investors in these mortgage-backed securities receive a rate of return based on the level of payments that people make on all the mortgages that stand behind the security.

Securitization offers certain advantages. If a bank makes most of its loans in a local area, then the bank may be financially vulnerable if the local economy declines, so that many people are unable to make their payments. But if a bank sells its local loans, and then buys a mortgage-backed security based on home loans in many parts of the country, it can avoid being exposed to local financial risks. (In the simple example in the text, banks just own “bonds.” In reality, banks can own a number of financial instruments, as long as these financial investments are safe enough to satisfy the government bank regulators.) From the standpoint of a local homebuyer, securitization offers the benefit that a local bank does not need to have lots of extra funds to make a loan, because the bank is only planning to hold that loan for a short time, before selling the loan so that it can be pooled into a financial security.

But securitization also offers one potentially large disadvantage. If a bank is going to hold a mortgage loan as an asset, the bank has an incentive to scrutinize the borrower carefully to ensure that the loan is likely to be repaid. However, a bank that is going to sell the loan may be less careful in making the loan in the first place. The bank will be more willing to make what are called “subprime loans,” which are loans that have characteristics like low or zero down-payment, little scrutiny of whether the borrower has a reliable income, and sometimes low payments for the first year or two that will be followed by much higher payments after that. Some subprime loans made in the mid-2000s were later dubbed NINJA loans: loans made even though the borrower had demonstrated No Income, No Job, or Assets. These subprime loans were typically sold and turned into financial securities—but with a twist. The idea was that if losses occurred on these mortgage-backed securities, certain investors would agree to take the first, say, 5% of such losses. Other investors would agree to take, say, the next 5% of losses. By this approach, still other investors would not need to take any losses unless these mortgage-backed financial securities lost 25% or 30% or more of their total value. These complex securities, along with

other economic factors, encouraged a large expansion of subprime loans in the mid-2000s.
The economic stage was now set for a banking crisis. Banks thought they were buying only ultra-safe securities, because even though the securities were ultimately backed by risky subprime mortgages, the banks only invested in the part of those securities where they were protected from small or moderate levels of losses. But as housing prices fell after 2007, and the deepening recession made it harder for many people to make their mortgage payments, many banks found that their mortgage-backed financial assets could end up being worth much less than they had expected—and so the banks were staring bankruptcy in the face. In the 2008–2011 period, 318 banks failed in the United States.

The risk of an unexpectedly high level of loan defaults can be especially difficult for banks because a bank's liabilities, namely the deposits of its customers, can be withdrawn quickly, but many of the bank's assets like loans and bonds will only be repaid over years or even decades.This **asset-liability time mismatch**—a bank's liabilities can be withdrawn in the short term while its assets are repaid in the long term—can cause severe problems for a bank. For example, imagine a bank that has loaned a substantial amount of money at a certain interest rate, but then sees interest rates rise substantially. The bank can find itself in a precarious situation. If it does not raise the interest rate it pays to depositors, then deposits will flow to other institutions that offer the higher interest rates that are now prevailing. However, if the bank raises the interest rates that it pays to depositors, it may end up in a situation where it is paying a higher interest rate to depositors than it is collecting from those past loans that were made at lower interest rates. Clearly, the bank cannot survive in the long term if it is paying out more in interest to depositors than it is receiving from borrowers.

How can banks protect themselves against an unexpectedly high rate of loan defaults and against the risk of an asset-liability time mismatch? One strategy is for a bank to **diversify** its loans, which means lending to a variety of customers. For example, suppose a bank specialized in lending to

a niche market—say, making a high proportion of its loans to construction companies that build offices in one downtown area. If that one area suffers an unexpected economic downturn, the bank will suffer large losses. However, if a bank loans both to consumers who are buying homes and cars and also to a wide range of firms in many industries and geographic areas, the bank is less exposed to risk. When a bank diversifies its loans, those categories of borrowers who have an unexpectedly large number of defaults will tend to be balanced out, according to random chance, by other borrowers who have an unexpectedly low number of defaults. Thus, diversification of loans can help banks to keep a positive net worth. However, if a widespread recession occurs that touches many industries and geographic areas, diversification will not help.

Along with diversifying their loans, banks have several other strategies to reduce the risk of an unexpectedly large number of loan defaults. For example, banks can sell some of the loans they make in the secondary loan market, as described earlier, and instead hold a greater share of assets in the form of government bonds or reserves. Nevertheless, in a lengthy recession, most banks will see their net worth decline because a higher share of loans will not be repaid in tough economic times.

Key Concepts and Summary

Banks facilitate the use of money for transactions in the economy because people and firms can use bank accounts when selling or buying goods and services, when paying a worker or being paid, and when saving money or receiving a loan. In the financial capital market, banks are financial intermediaries; that is, they operate between savers who supply financial capital and borrowers who demand loans. A balance sheet (sometimes called a T-account) is an accounting tool which lists assets in one column and liabilities in another column. The liabilities of a bank are its deposits. The assets of a bank include its loans, its ownership of bonds, and its reserves (which are not loaned out). The net worth of a bank is calculated by subtracting the bank’s liabilities from its assets. Banks run a risk of negative net worth if the value of their assets declines. The value of assets can decline because of an unexpectedly high number of defaults on loans, or if interest rates rise and the bank suffers an asset-liability time mismatch

in which the bank is receiving a low rate of interest on its long-term loans but must pay the currently higher market rate of interest to attract depositors. Banks can protect themselves against these risks by choosing to diversify their loans or to hold a greater proportion of their assets in bonds and reserves. If banks hold only a fraction of their deposits as reserves, then the process of banks' lending money, those loans being re-deposited in banks, and the banks making additional loans will create money in the economy.

Self-Check Questions

Exercise:

Problem:

Explain why the money listed under assets on a bank balance sheet may not actually be in the bank?

Solution:

A bank's assets include cash held in their vaults, but assets also include monies that the bank holds at the Federal Reserve Bank (called "reserves"), loans that are made to customers, and bonds.

Review Questions

Exercise:

Problem: Why is a bank called a financial intermediary?

Exercise:

Problem: What does a balance sheet show?

Exercise:

Problem: What are the assets of a bank? What are its liabilities?

Exercise:

Problem: How do you calculate the net worth of a bank?

Exercise:

Problem: How can a bank end up with negative net worth?

Exercise:

Problem: What is the asset-liability time mismatch that all banks face?

Exercise:

Problem: What is the risk if a bank does not diversify its loans?

Critical Thinking Questions

Exercise:

Problem:

Explain the difference between how you would characterize bank deposits and loans as assets and liabilities on your own personal balance sheet and how a bank would characterize deposits and loans as assets and liabilities on its balance sheet.

Problems

Exercise:

Problem:

A bank has deposits of $400. It holds reserves of $50. It has purchased government bonds worth $70. It has made loans of $500. Set up a T-account balance sheet for the bank, with assets and liabilities, and calculate the bank’s net worth.

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Glossary

asset
: item of value owned by a firm or an individual

asset–liability time mismatch
: a bank’s liabilities can be withdrawn in the short term while its assets are repaid in the long term

balance sheet
: an accounting tool that lists assets and liabilities

bank capital
: a bank’s net worth

depository institution
: institution that accepts money deposits and then uses these to make loans

diversify
: making loans or investments with a variety of firms, to reduce the risk of being adversely affected by events at one or a few firms

financial intermediary
: an institution that operates between a saver with financial assets to invest and an entity who will borrow those assets and pay a rate of return

liability
: any amount or debt owed by a firm or an individual

net worth
: the excess of the asset value over and above the amount of the liability; total assets minus total liabilities

payment system
: helps an economy exchange goods and services for money or other financial assets

reserves
: funds that a bank keeps on hand and that are not loaned out or invested in bonds

T-account
: a balance sheet with a two-column format, with the T-shape formed by the vertical line down the middle and the horizontal line under the column headings for “Assets” and “Liabilities”

transaction costs
: the costs associated with finding a lender or a borrower for money

How Banks Create Money

By the end of this section, you will be able to:

- Utilize the money multiplier formulate to determine how banks create money
- Analyze and create T-account balance sheets
- Evaluate the risks and benefits of money and banks

Banks and money are intertwined. It is not just that most money is in the form of bank accounts. The banking system can literally create money through the process of making loans. Let's see how.

Money Creation by a Single Bank

Start with a hypothetical bank called Singleton Bank. The bank has $10 million in deposits. The T-account balance sheet for Singleton Bank, when it holds all of the deposits in its vaults, is shown in [link]. At this stage, Singleton Bank is simply storing money for depositors and is using these deposits to make loans. In this simplified example, Singleton Bank cannot earn any interest income from these loans and cannot pay its depositors an interest rate either.

Singleton Bank's Balance Sheet: Receives $10 million in Deposits

Assets		Liabilities + Net Worth	
Reserves	$10 million	Deposits	$10 million

Singleton Bank is required by the Federal Reserve to keep $1 million on reserve (10% of total deposits). It will loan out the remaining $9 million. By loaning out the $9 million and charging interest, it will be able to make interest payments to depositors and earn interest income for Singleton Bank (for now, we will keep it simple and not put interest income on the balance sheet). Instead of becoming just a storage place for deposits, Singleton Bank can become a financial intermediary between savers and borrowers.

This change in business plan alters Singleton Bank's balance sheet, as shown in [link]. Singleton's assets have changed; it now has $1 million in reserves and a loan to Hank's Auto Supply of $9 million. The bank still has $10 million in deposits.

Singleton Bank's Balance Sheet: 10% Reserves, One Round of Loans

Assets		Liabilities + Net Worth	
Reserves	$1 million	Deposits	$10 million
Loan to Hank's Auto Supply	$9 million		

Singleton Bank lends $9 million to Hank's Auto Supply. The bank records this loan by making an entry on the balance sheet to indicate that a loan has been made. This loan is an asset, because it will generate interest income for the bank. Of course, the loan officer is not going to let Hank walk out of the bank with $9 million in cash. The bank issues Hank's Auto Supply a cashier's check for the $9 million. Hank deposits the loan in his regular

checking account with First National. The deposits at First National rise by $9 million and its reserves also rise by $9 million, as [link] shows. First National must hold 10% of additional deposits as required reserves but is free to loan out the rest

First National Balance Sheet

Assets		Liabilities + Net Worth	
Reserves	+ $9 million	Deposits	+ $9 million

Making loans that are deposited into a demand deposit account increases the M1 money supply. Remember the definition of M1 includes checkable (demand) deposits, which can be easily used as a medium of exchange to buy goods and services. Notice that the money supply is now $19 million: $10 million in deposits in Singleton bank and $9 million in deposits at First National. Obviously these deposits will be drawn down as Hank's Auto Supply writes checks to pay its bills. But the bigger picture is that a bank must hold enough money in reserves to meet its liabilities; the rest the bank loans out. In this example so far, bank lending has expanded the money supply by $9 million.

Now, First National must hold only 10% as required reserves ($900,000) but can lend out the other 90% ($8.1 million) in a loan to Jack's Chevy Dealership as shown in [link].

First National Balance Sheet

Assets		Liabilities + Net Worth	
Reserves	$900,000	Deposits	+ $9 million
Loans	$8.1 million		

If Jack's deposits the loan in its checking account at Second National, the money supply just increased by an additional $8.1 million, as [link] shows.

Second National Bank's Balance Sheet

Assets		Liabilities + Net Worth	
Reserves	+ $8.1 million	Deposits	+ $8.1 million

How is this money creation possible? It is possible because there are multiple banks in the financial system, they are required to hold only a fraction of their deposits, and loans end up deposited in other banks, which increases deposits and, in essence, the money supply.

Note:
Watch this video to learn more about how banks create money.

The Money Multiplier and a Multi-Bank System

In a system with multiple banks, the initial excess reserve amount that Singleton Bank decided to lend to Hank's Auto Supply was deposited into Frist National Bank, which is free to loan out $8.1 million. If all banks loan out their excess reserves, the money supply will expand. In a multi-bank system, the amount of money that the system can create is found by using the money multiplier. The money multiplier tells us by how many times a loan will be "multiplied" as it is spent in the economy and then re-deposited in other banks.

Fortunately, a formula exists for calculating the total of these many rounds of lending in a banking system. The **money multiplier formula** is:
Equation:

$$\frac{1}{\text{Reserve Requirement}}$$

The money multiplier is then multiplied by the change in excess reserves to determine the total amount of M1 money supply created in the banking system. See the Work it Out feature to walk through the multiplier calculation.

Note:
Using the Money Multiplier Formula
Using the money multiplier for the example in this text:
Step 1. In the case of Singleton Bank, for whom the reserve requirement is 10% (or 0.10), the money multiplier is 1 divided by .10, which is equal to 10.
Step 2. We have identified that the excess reserves are $9 million, so, using the formula we can determine the total change in the M1 money supply:
Equation:

$$\begin{aligned}\text{Total Change in the M1 Money Supply} &= \frac{1}{\text{Reserve Requirement}} \times \text{Excess Requirement} \\ &= \frac{1}{0.10} \times \$9 \text{ million} \\ &= 10 \times \$9 \text{ million} \\ &= \$90 \text{ million}\end{aligned}$$

Step 3. Thus, we can say that, in this example, the total quantity of money generated in this economy after all rounds of lending are completed will be $90 million.

Cautions about the Money Multiplier

The money multiplier will depend on the proportion of reserves that banks are required to hold by the Federal Reserve Bank. Additionally, a bank can also choose to hold extra reserves. Banks may decide to vary how much they hold in reserves for two reasons: macroeconomic conditions and government rules. When an economy is in recession, banks are likely to hold a higher proportion of reserves because they fear that loans are less likely to be repaid when the economy is slow. The Federal Reserve may also raise or lower the required reserves held by banks as a policy move to affect the quantity of money in an economy, as Monetary Policy and Bank Regulation will discuss.

The process of how banks create money shows how the quantity of money in an economy is closely linked to the quantity of lending or credit in the economy. Indeed, all of the money in the economy, except for the original reserves, is a result of bank loans that are re-deposited and loaned out, again, and again.

Finally, the money multiplier depends on people re-depositing the money that they receive in the banking system. If people instead store their cash in safe-deposit boxes or in shoeboxes hidden in their closets, then banks cannot recirculate the money in the form of loans. Indeed, central banks have an incentive to assure that bank deposits are safe because if people worry that they may lose their bank deposits, they may start holding more money in cash, instead of depositing it in banks, and the quantity of loans in an economy will decline. Low-income countries have what economists sometimes refer to as “mattress savings,” or money that people are hiding in their homes because they do not trust banks. When mattress savings in an economy are substantial, banks cannot lend out those funds and the money multiplier cannot operate as effectively. The overall quantity of money and loans in such an economy will decline.

Note:
Watch a video of Jem Bendell discussing “The Money Myth.”



Money and Banks—Benefits and Dangers

Money and banks are marvelous social inventions that help a modern economy to function. Compared with the alternative of barter, money makes market exchanges vastly easier in goods, labor, and financial markets. Banking makes money still more effective in facilitating exchanges in goods and labor markets. Moreover, the process of banks making loans in financial capital markets is intimately tied to the creation of money.

But the extraordinary economic gains that are possible through money and banking also suggest some possible corresponding dangers. If banks are not working well, it sets off a decline in convenience and safety of transactions throughout the economy. If the banks are under financial stress, because of a widespread decline in the value of their assets, loans may become far less available, which can deal a crushing blow to sectors of the economy that depend on borrowed money like business investment, home construction, and car manufacturing. The Great Recession of 2008–2009 illustrated this pattern.

Note:
The Many Disguises of Money: From Cowries to Bit Coins
The global economy has come a long way since it started using cowrie shells as currency. We have moved away from commodity and commodity-backed paper money to fiat currency. As technology and global integration increases, the need for paper currency is diminishing, too. Every day, we witness the increased use of debit and credit cards.
The latest creation and perhaps one of the purest forms of fiat money is the Bitcoin. Bitcoins are a digital currency that allows users to buy goods and services online. Products and services such as videos and books may be purchased using Bitcoins. It is not backed by any commodity nor has it been decreed by any government as legal tender, yet it used as a medium of exchange and its value (online at least) can be stored. It is also unregulated by any central bank, but is created online through people solving very complicated mathematics problems and getting paid afterward. Bitcoin.org is an information source if you are curious. Bitcoins are a relatively new type of money. At present, because it is not sanctioned as a legal currency by any country nor regulated by any central bank, it lends itself for use in illegal trading activities as well as legal ones. As technology increases and the need to reduce transactions costs associated with using traditional forms of money increases, Bitcoins or some sort of digital currency may replace our dollar bill, just as the cowrie shell was replaced.

Key Concepts and Summary

The money multiplier is defined as the quantity of money that the banking system can generate from each $1 of bank reserves. The formula for calculating the multiplier is 1/reserve ratio, where the reserve ratio is the fraction of deposits that the bank wishes to hold as reserves. The quantity of money in an economy and the quantity of credit for loans

are inextricably intertwined. Much of the money in an economy is created by the network of banks making loans, people making deposits, and banks making more loans.

Given the macroeconomic dangers of a malfunctioning banking system, Monetary Policy and Bank Regulation will discuss government policies for controlling the money supply and for keeping the banking system safe.

Self-Check Questions

Exercise:

Problem:

Imagine that you are in the position of buying loans in the secondary market (that is, buying the right to collect the payments on loans made by banks) for a bank or other financial services company. Explain why you would be willing to pay more or less for a given loan if:

a. The borrower has been late on a number of loan payments
b. Interest rates in the economy as a whole have risen since the loan was made
c. The borrower is a firm that has just declared a high level of profits
d. Interest rates in the economy as a whole have fallen since the loan was made

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Solution:

a. A borrower who has been late on a number of loan payments looks perhaps less likely to repay the loan, or to repay it on time, and so you would want to pay less for that loan.
b. If interest rates generally have risen, then this loan made at a time of relatively lower interest rates looks less attractive, and you would pay less for it.
c. If the borrower is a firm with a record of high profits, then it is likely to be able to repay the loan, and you would be willing to pay more for the loan.
d. If interest rates in the economy have fallen, then the loan is worth more.

Review Questions

Exercise:

Problem: How do banks create money?

Exercise:

Problem: What is the formula for the money multiplier?

Critical Thinking Questions

Exercise:

Problem: Should banks have to hold 100% of their deposits? Why or why not?

Exercise:

Problem:

Explain what will happen to the money multiplier process if there is an increase in the reserve requirement?

Exercise:

Problem:

What do you think the Federal Reserve Bank did to the reserve requirement during the Great Recession of 2008–2009?

Problems

Exercise:

Problem:

Humongous Bank is the only bank in the economy. The people in this economy have $20 million in money, and they deposit all their money in Humongous Bank.

a. Humongous Bank decides on a policy of holding 100% reserves. Draw a T-account for the bank.
b. Humongous Bank is required to hold 5% of its existing $20 million as reserves, and to loan out the rest. Draw a T-account for the bank after this first round of loans has been made.
c. Assume that Humongous bank is part of a multibank system. How much will money supply increase with that original loan of $19 million?

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closer-look-bitcoin.

Glossary

money multiplier formula
: total money in the economy divided by the original quantity of money, or change in the total money in the economy divided by a change in the original quantity of money

Introduction to the Aggregate Demand/Aggregate Supply Model

class="introduction"

In this chapter, you will learn about:

- Macroeconomic Perspectives on Demand and Supply
- Building a Model of Aggregate Demand and Aggregate Supply
- Shifts in Aggregate Supply
- Shifts in Aggregate Demand
- How the AD/AS Model Incorporates Growth, Unemployment, and Inflation
- Keynes' Law and Say's Law in the AD/AS Model

New Home Construction

At the peak of the housing bubble, many people across the country were able to secure the loans necessary to build new houses. (Credit: modification of work by Tim Pierce/Flickr Creative Commons)

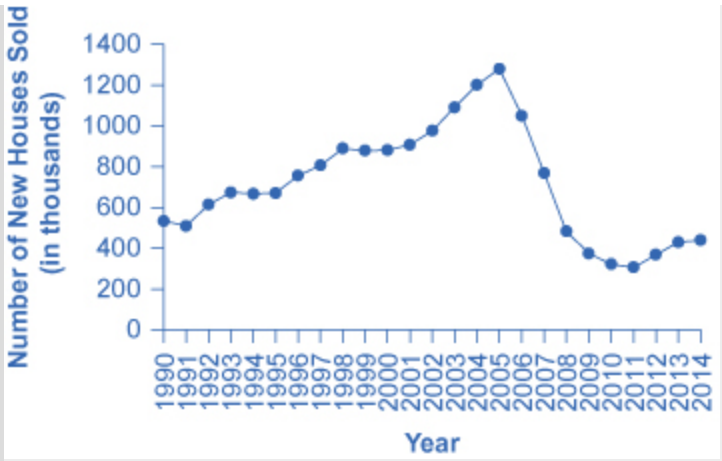


Note:

From Housing Bubble to Housing Bust

The United States experienced rising home ownership rates for most of the last two decades. Between 1990 and 2006, the U.S. housing market grew. Homeownership rates grew from 64% to a high of over 69% between 2004 and 2005. For many people, this was a period in which they could either buy first homes or buy a larger and more expensive home. During this time mortgage values tripled. Housing became more accessible to Americans and was considered to be a safe financial investment. [link] shows how new single family home sales peaked in 2005 at 107,000 units.

New Single Family Houses Sold



From the early 1990s up through 2005, the number of new single family houses sold rose steadily. In 2006, the number dropped dramatically and this dramatic decline continued through 2011. By 2014, the number of new houses sold had begun to climb back up, but the levels are still lower than those of 1990. (Source: U.S. Census Bureau)

The housing bubble began to show signs of bursting in 2005, as delinquency and late payments began to grow and an oversupply of new homes on the market became apparent. Dropping home values contributed to a decrease in the overall wealth of the household sector and caused homeowners to pull back on spending. Several mortgage lenders were forced to file for bankruptcy because homeowners were not making their payments, and by 2008 the problem had spread throughout the financial markets. Lenders clamped down on credit and the housing bubble burst. Financial markets were now in crisis and unable or unwilling to even extend credit to credit-worthy customers.

The housing bubble and the crisis in the financial markets were major contributors to the Great Recession that led to unemployment rates over 10% and falling GDP. While the United States is still recovering from the impact of the Great Recession, it has made substantial progress in restoring

financial market stability through the implementation of aggressive fiscal and monetary policy.
The economic history of the United States is cyclical in nature with recessions and expansions. Some of these fluctuations are severe, such as the economic downturn experienced during Great Depression of the 1930's which lasted several years. Why does the economy grow at different rates in different years? What are the causes of the cyclical behavior of the economy? This chapter will introduce an important model, the aggregate demand–aggregate supply model, to begin our understanding of why economies expand and contract over time.

Note:
Introduction to the Aggregate Supply–Aggregate Demand Model
In this chapter, you will learn about:

- Macroeconomic Perspectives on Demand and Supply
- Building a Model of Aggregate Supply and Aggregate Demand
- Shifts in Aggregate Supply
- Shifts in Aggregate Demand
- How the AS–AD Model Incorporates Growth, Unemployment, and Inflation
- Keynes' Law and Say's Law in the AS–AD Model

A key part of macroeconomics is the use of models to analyze macro issues and problems. How is the rate of economic growth connected to changes in the unemployment rate? Is there a reason why unemployment and inflation seem to move in opposite directions: lower unemployment and higher inflation from 1997 to 2000, higher unemployment and lower inflation in the early 2000s, lower unemployment and higher inflation in the mid-2000s, and then higher unemployment and lower inflation in 2009? Why did the current account deficit rise so high, but then decline in 2009?

To analyze questions like these, we must move beyond discussing macroeconomic issues one at a time, and begin building economic models that will capture the relationships and interconnections between them. The next three chapters take up this task. This chapter introduces the macroeconomic model of aggregate supply and aggregate demand, how the two interact to reach a macroeconomic equilibrium, and how shifts in aggregate demand or aggregate supply will affect that equilibrium. This chapter also relates the model of aggregate supply and aggregate demand to the three goals of economic policy (growth, unemployment, and inflation), and provides a framework for thinking about many of the connections and tradeoffs between these goals. The chapter on The Keynesian Perspective focuses on the macroeconomy in the short run, where aggregate demand plays a crucial role. The chapter on The Neoclassical Perspective explores the macroeconomy in the long run, where aggregate supply plays a crucial role.

Macroeconomic Perspectives on Demand and Supply
By the end of this section, you will be able to:

- Explain Say's Law and determine whether it applies in the short run or the long run
- Explain Keynes' Law and determine whether it applies in the short run or the long run

Macroeconomists over the last two centuries have often divided into two groups: those who argue that supply is the most important determinant of the size of the macroeconomy while demand just tags along, and those who argue that demand is the most important factor in the size of the macroeconomy while supply just tags along.

Say's Law and the Macroeconomics of Supply

Those economists who emphasize the role of supply in the macroeconomy often refer to the work of a famous French economist of the early nineteenth century named Jean-Baptiste Say (1767–1832). **Say's law** is: "Supply creates its own demand." As a matter of historical accuracy, it seems clear that Say never actually wrote down this law and that it oversimplifies his beliefs, but the law lives on as useful shorthand for summarizing a point of view.

The intuition behind Say's law is that each time a good or service is produced and sold, it generates income that is earned for someone: a worker, a manager, an owner, or those who are workers, managers, and owners at firms that supply inputs along the chain of production. The forces of supply and demand in individual markets will cause prices to rise and fall. The bottom line remains, however, that every sale represents income to someone, and so, Say's law argues, a given value of supply must create an equivalent value of demand somewhere else in the economy. Because Jean-Baptiste Say, Adam Smith, and other economists writing around the turn of the nineteenth century who discussed this view were known as "classical" economists, modern economists who generally subscribe to the Say's law view on the importance of supply for determining the size of the macroeconomy are called **neoclassical economists**.

If supply always creates exactly enough demand at the macroeconomic level, then (as Say himself recognized) it is hard to understand why periods of recession and high unemployment should ever occur. To be sure, even if total supply always creates an equal amount of total demand, the economy could still experience a situation of some firms earning profits while other firms suffer losses. Nevertheless, a recession is not a situation where all business failures are exactly counterbalanced by an offsetting number of successes. A recession is a situation in which the economy as a whole is shrinking in size, business failures outnumber the remaining success stories, and many firms end up suffering losses and laying off workers.

Say's law that supply creates its own demand does seem a good approximation for the long run. Over periods of some years or decades, as the productive power of an economy to supply goods and services increases, total demand in the economy grows at roughly the same pace. However, over shorter time horizons of a few months or even years, recessions or even depressions occur in which firms, as a group, seem to face a lack of demand for their products.

Keynes' Law and the Macroeconomics of Demand

The alternative to Say's law, with its emphasis on supply, can be named **Keynes' law**: "Demand creates its own supply." As a matter of historical accuracy, just as Jean-Baptiste Say never wrote down anything as simpleminded as Say's law, John Maynard Keynes never wrote down Keynes' law, but the law is a useful simplification that conveys a certain point of view.

When Keynes wrote his great work *The General Theory of Employment, Interest, and Money* during the Great Depression of the 1930s, he pointed out that during the Depression, the capacity of the economy to supply goods and services had not changed much. U.S. unemployment rates soared higher than 20% from 1933 to 1935, but the number of possible workers had not increased or decreased much. Factories were closed and shuttered, but machinery and equipment had not disappeared. Technologies that had been invented in the 1920s were not un-invented and forgotten in the 1930s. Thus, Keynes argued that the Great Depression—and many ordinary

recessions as well—were not caused by a drop in the ability of the economy to supply goods as measured by labor, physical capital, or technology. He argued the economy often produced less than its full potential, not because it was technically impossible to produce more with the existing workers and machines, but because a lack of demand in the economy as a whole led to inadequate incentives for firms to produce. In such cases, he argued, the level of GDP in the economy was not primarily determined by the potential of what the economy could supply, but rather by the amount of total demand.

Keynes' law seems to apply fairly well in the short run of a few months to a few years, when many firms experience either a drop in demand for their output during a recession or so much demand that they have trouble producing enough during an economic boom. However, demand cannot tell the whole macroeconomic story, either. After all, if demand was all that mattered at the macroeconomic level, then the government could make the economy as large as it wanted just by pumping up total demand through a large increase in the government spending component or by legislating large tax cuts to push up the consumption component. Economies do, however, face genuine limits to how much they can produce, limits determined by the quantity of labor, physical capital, technology, and the institutional and market structures that bring these factors of production together. These constraints on what an economy can supply at the macroeconomic level do not disappear just because of an increase in demand.

Combining Supply and Demand in Macroeconomics

Two insights emerge from this overview of Say's law with its emphasis on macroeconomic supply and Keynes' law with its emphasis on macroeconomic demand. The first conclusion, which is not exactly a hot news flash, is that an economic approach focused only on the supply side or only on the demand side can be only a partial success. Both supply and demand need to be taken into account. The second conclusion is that since Keynes' law applies more accurately in the short run and Say's law applies more accurately in the long run, the tradeoffs and connections between the

three goals of macroeconomics may be different in the short run and the long run.

Key Concepts and Summary

Neoclassical economists emphasize Say’s law, which holds that supply creates its own demand. Keynesian economists emphasize Keynes’ law, which holds that demand creates its own supply. Many mainstream economists take a Keynesian perspective, emphasizing the importance of aggregate demand, for the short run, and a neoclassical perspective, emphasizing the importance of aggregate supply, for the long run.

Self-Check Questions

Exercise:

Problem:

Describe the mechanism by which supply creates its own demand.

Solution:

In order to supply goods, suppliers must employ workers, whose incomes increase as a result of their labor. They use this additional income to demand goods of an equivalent value to those they supply.

Exercise:

Problem:

Describe the mechanism by which demand creates its own supply.

Solution:

When consumers demand more goods than are available on the market, prices are driven higher and the additional opportunities for profit induce more suppliers to enter the market, producing an equivalent amount to that which is demanded.

Review Questions

Exercise:

Problem: What is Say's law?

Exercise:

Problem: What is Keynes' law?

Exercise:

Problem:

Do neoclassical economists believe in Keynes' law or Say's law?

Exercise:

Problem:

Does Say's law apply more accurately in the long run or the short run? What about Keynes' law?

Critical Thinking Question

Exercise:

Problem:

Why would an economist choose either the neoclassical perspective or the Keynesian perspective, but not both?

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Glossary

Keynes' law
: "demand creates its own supply"

neoclassical economists
: economists who generally emphasize the importance of aggregate supply in determining the size of the macroeconomy over the long run

Say's law
: "supply creates its own demand"

Building a Model of Aggregate Demand and Aggregate Supply
By the end of this section, you will be able to:

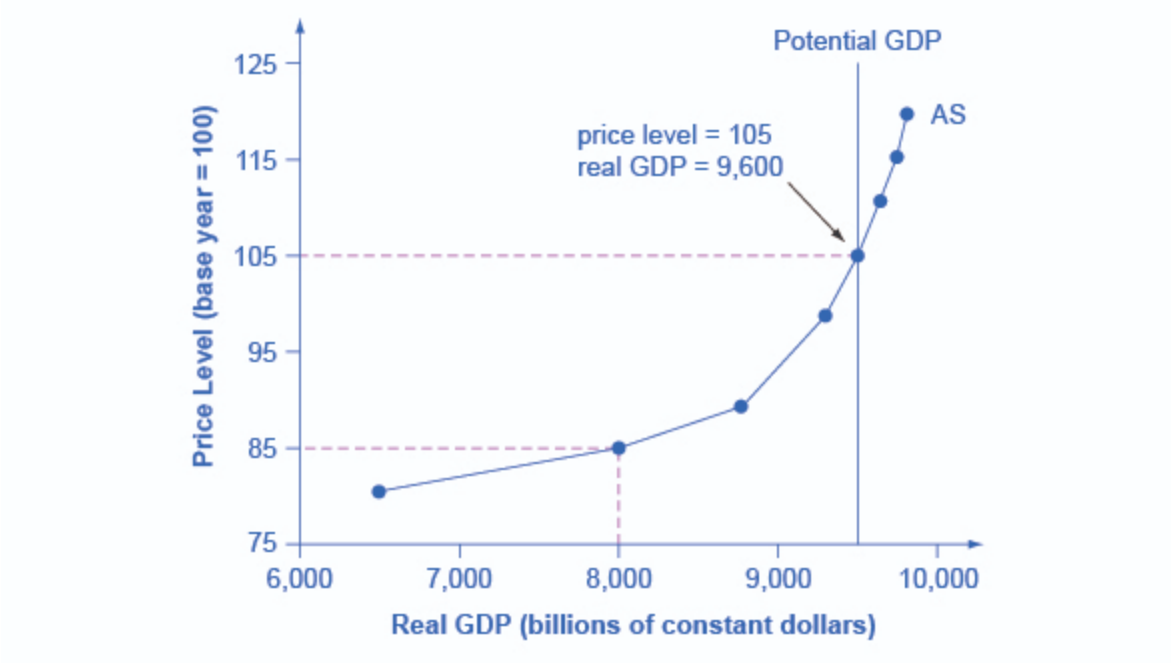
- Explain the aggregate supply curve and how it relates to real GDP and potential GDP
- Explain the aggregate demand curve and how it is influenced by price levels
- Interpret the aggregate demand/aggregate supply model
- Identify the point of equilibrium in the aggregate demand/aggregate supply model
- Define short run aggregate supply and long run aggregate supply

To build a useful macroeconomic model, we need a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level. This model is called the **aggregate demand/aggregate supply model**. This module will explain aggregate supply, aggregate demand, and the equilibrium between them. The following modules will discuss the causes of shifts in aggregate supply and aggregate demand.

The Aggregate Supply Curve and Potential GDP

Firms make decisions about what quantity to supply based on the profits they expect to earn. Profits, in turn, are also determined by the price of the outputs the firm sells and by the price of the inputs, like labor or raw materials, the firm needs to buy. **Aggregate supply (AS)** refers to the total quantity of output (i.e. real GDP) firms will produce and sell. The **aggregate supply (AS) curve** shows the total quantity of output (i.e. real GDP) that firms will produce and sell at each price level.

[link] shows an aggregate supply curve. In the following paragraphs, we will walk through the elements of the diagram one at a time: the horizontal and vertical axes, the aggregate supply curve itself, and the meaning of the potential GDP vertical line.
The Aggregate Supply Curve



Aggregate supply (AS) slopes up, because as the price level for outputs rises, with the price of inputs remaining fixed, firms have an incentive to produce more and to earn higher profits. The potential GDP line shows the maximum that the economy can produce with full employment of workers and physical capital.

The horizontal axis of the diagram shows real GDP—that is, the level of GDP adjusted for inflation. The vertical axis shows the price level. Remember that the price level is different from the inflation rate. Visualize the price level as an index number, like the GDP deflator, while the inflation rate is the percentage change between price levels over time.

As the price level (the average price of all goods and services produced in the economy) rises, the aggregate quantity of goods and services supplied rises as well. Why? The price level shown on the vertical axis represents prices for final goods or outputs bought in the economy—like the GDP deflator—not the price level for intermediate goods and services that are inputs to production. Thus, the AS curve describes how suppliers will react to a higher price level for final outputs of goods and services, while holding the prices of inputs like labor and energy constant. If firms across the

economy face a situation where the price level of what they produce and sell is rising, but their costs of production are not rising, then the lure of higher profits will induce them to expand production.

The slope of an AS curve changes from nearly flat at its far left to nearly vertical at its far right. At the far left of the aggregate supply curve, the level of output in the economy is far below **potential GDP**, which is defined as the quantity that an economy can produce by fully employing its existing levels of labor, physical capital, and technology, in the context of its existing market and legal institutions. At these relatively low levels of output, levels of unemployment are high, and many factories are running only part-time, or have closed their doors. In this situation, a relatively small increase in the prices of the outputs that businesses sell—while making the assumption of no rise in input prices—can encourage a considerable surge in the quantity of aggregate supply because so many workers and factories are ready to swing into production.

As the quantity produced increases, however, certain firms and industries will start running into limits: perhaps nearly all of the expert workers in a certain industry will have jobs or factories in certain geographic areas or industries will be running at full speed. In the intermediate area of the AS curve, a higher price level for outputs continues to encourage a greater quantity of output—but as the increasingly steep upward slope of the aggregate supply curve shows, the increase in quantity in response to a given rise in the price level will not be quite as large. (Read the following Clear It Up feature to learn why the AS curve crosses potential GDP.)

Note:

Why does AS cross potential GDP?

The aggregate supply curve is typically drawn to cross the potential GDP line. This shape may seem puzzling: How can an economy produce at an output level which is higher than its “potential” or “full employment” GDP? The economic intuition here is that if prices for outputs were high enough, producers would make fanatical efforts to produce: all workers would be on double-overtime, all machines would run 24 hours a day, seven days a week. Such hyper-intense production would go beyond using

potential labor and physical capital resources fully, to using them in a way that is not sustainable in the long term. Thus, it is indeed possible for production to sprint above potential GDP, but only in the short run.

At the far right, the aggregate supply curve becomes nearly vertical. At this quantity, higher prices for outputs cannot encourage additional output, because even if firms want to expand output, the inputs of labor and machinery in the economy are fully employed. In this example, the vertical line in the exhibit shows that potential GDP occurs at a total output of 9,500. When an economy is operating at its potential GDP, machines and factories are running at capacity, and the unemployment rate is relatively low—at the natural rate of unemployment. For this reason, potential GDP is sometimes also called **full-employment GDP**.

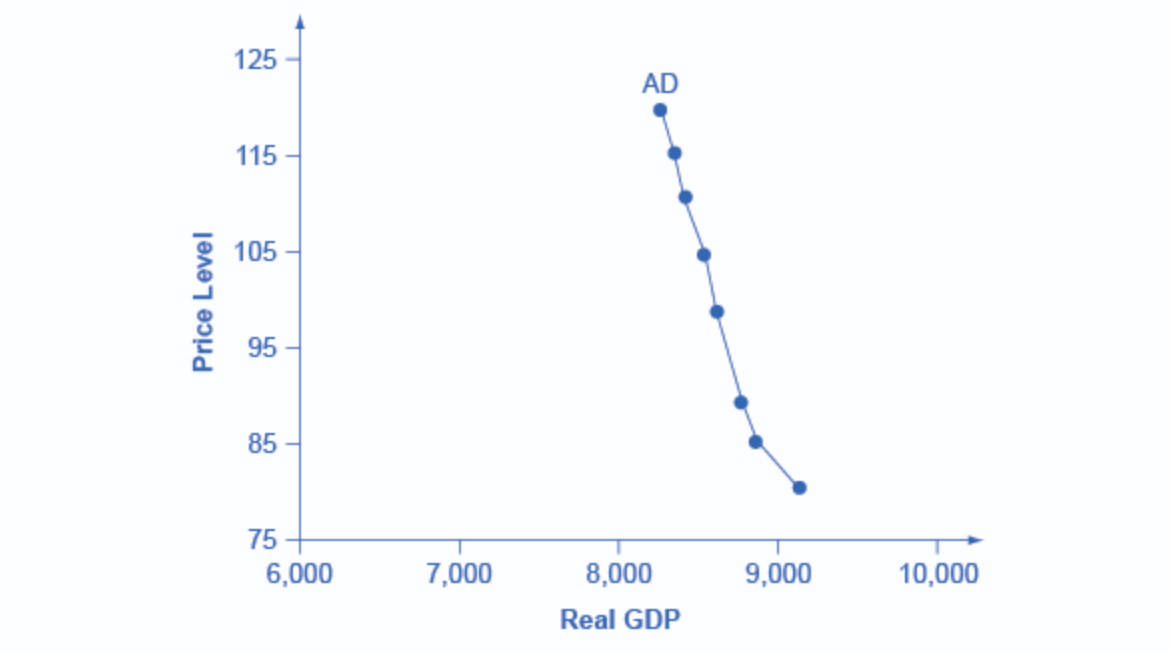
The Aggregate Demand Curve

Aggregate demand (AD) refers to the amount of total spending on domestic goods and services in an economy. (Strictly speaking, AD is what economists call total planned expenditure. This distinction will be further explained in the appendix The Expenditure-Output Model . For now, just think of aggregate demand as total spending.) It includes all four components of demand: consumption, investment, government spending, and net exports (exports minus imports). This demand is determined by a number of factors, but one of them is the price level—recall though, that the price level is an index number such as the GDP deflator that measures the average price of the things we buy. The **aggregate demand (AD) curve** shows the total spending on domestic goods and services at each price level.

[link] presents an aggregate demand (AD) curve. Just like the aggregate supply curve, the horizontal axis shows real GDP and the vertical axis shows the price level. The AD curve slopes down, which means that increases in the price level of outputs lead to a lower quantity of total spending. The reasons behind this shape are related to how changes in the price level affect the different components of aggregate demand. The following components make up aggregate demand: consumption spending

(C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M): C + I + G + X – M.

The Aggregate Demand Curve



Aggregate demand (AD) slopes down, showing that, as the price level rises, the amount of total spending on domestic goods and services declines.

The wealth effect holds that as the price level increases, the buying power of savings that people have stored up in bank accounts and other assets will diminish, eaten away to some extent by inflation. Because a rise in the price level reduces people's wealth, consumption spending will fall as the price level rises.

The interest rate effect is that as prices for outputs rise, the same purchases will take more money or credit to accomplish. This additional demand for money and credit will push interest rates higher. In turn, higher interest rates will reduce borrowing by businesses for investment purposes and reduce borrowing by households for homes and cars—thus reducing consumption and investment spending.

The foreign price effect points out that if prices rise in the United States while remaining fixed in other countries, then goods in the United States will be relatively more expensive compared to goods in the rest of the world. U.S. exports will be relatively more expensive, and the quantity of exports sold will fall. U.S. imports from abroad will be relatively cheaper, so the quantity of imports will rise. Thus, a higher domestic price level, relative to price levels in other countries, will reduce net export expenditures.

Truth be told, among economists all three of these effects are controversial, in part because they do not seem to be very large. For this reason, the aggregate demand curve in [link] slopes downward fairly steeply; the steep slope indicates that a higher price level for final outputs reduces aggregate demand for all three of these reasons, but that the change in the quantity of aggregate demand as a result of changes in price level is not very large.

Read the following Work It Out feature to learn how to interpret the AD/AS model. In this example, aggregate supply, aggregate demand, and the price level are given for the imaginary country of Xurbia.

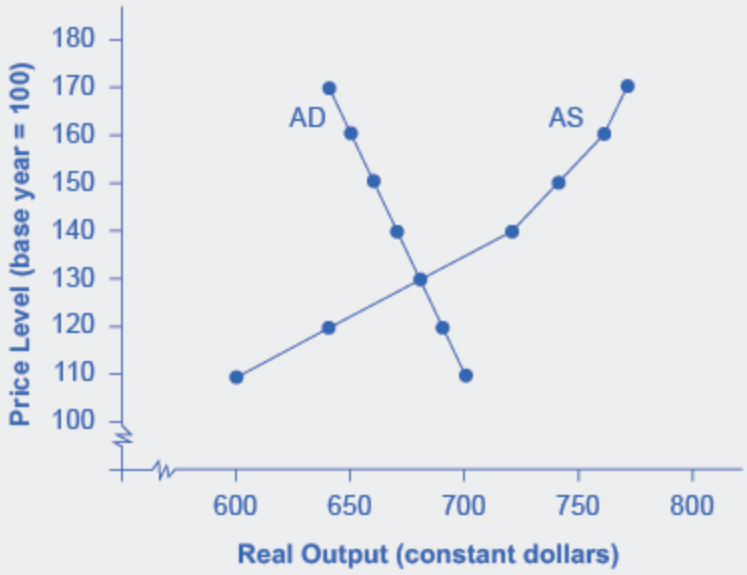
Note:
Interpreting the AD/AS Model
[link] shows information on aggregate supply, aggregate demand, and the price level for the imaginary country of Xurbia. What information does [link] tell you about the state of the Xurbia's economy? Where is the equilibrium price level and output level (this is the SR macroequilibrium)? Is Xurbia risking inflationary pressures or facing high unemployment? How can you tell?

Price Level	Aggregate Demand	Aggregate Supply

Price Level	Aggregate Demand	Aggregate Supply
110	$700	$600
120	$690	$640
130	$680	$680
140	$670	$720
150	$660	$740
160	$650	$760
170	$640	$770

Price Level: Aggregate Demand/Aggregate Supply

To begin to use the AD/AS model, it is important to plot the AS and AD curves from the data provided. What is the equilibrium?
Step 1. Draw your x- and y-axis. Label the x-axis Real GDP and the y-axis Price Level.
Step 2. Plot AD on your graph.
Step 3. Plot AS on your graph.
Step 4. Look at [link] which provides a visual to aid in your analysis.
The AD/AS Curves



AD and AS curves created from the data in [link].

Step 5. Determine where AD and AS intersect. This is the equilibrium with price level at 130 and real GDP at $680.
Step 6. Look at the graph to determine where equilibrium is located. We can see that this equilibrium is fairly far from where the AS curve becomes near-vertical (or at least quite steep) which seems to start at about $750 of real output. This implies that the economy is not close to potential GDP. Thus, unemployment will be high. In the relatively flat part of the AS curve, where the equilibrium occurs, changes in the price level will not be a major concern, since such changes are likely to be small.
Step 7. Determine what the steep portion of the AS curve indicates. Where the AS curve is steep, the economy is at or close to potential GDP.
Step 8. Draw conclusions from the given information:

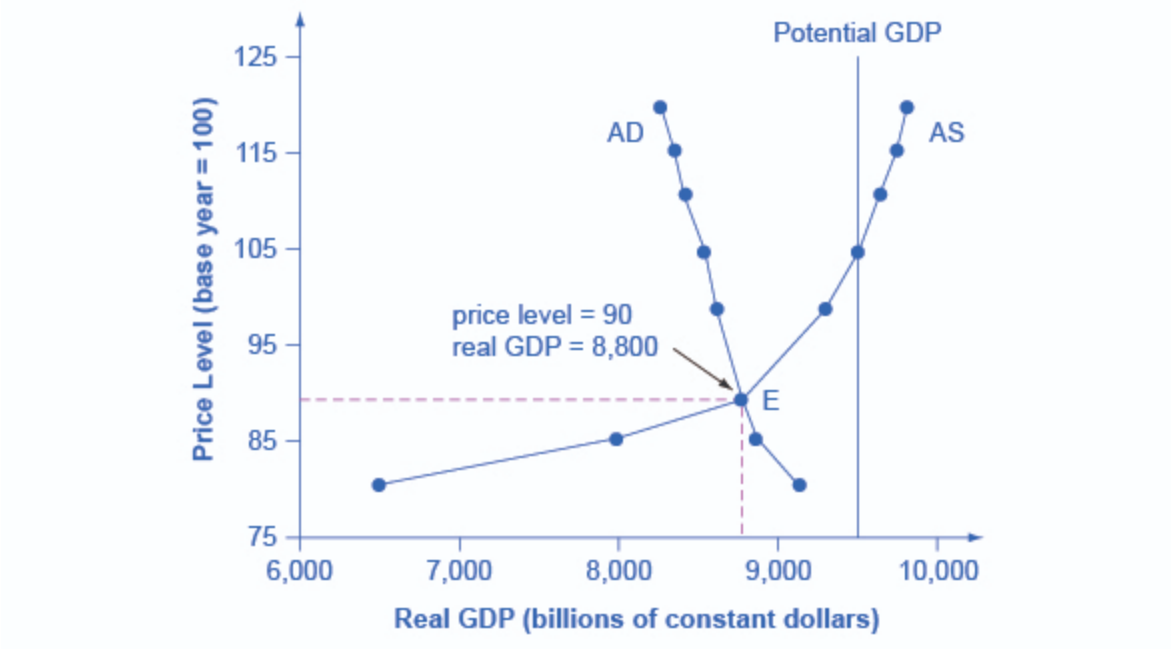
- If equilibrium occurs in the flat range of AS, then economy is not close to potential GDP and will be experiencing unemployment, but stable price level.
- If equilibrium occurs in the steep range of AS, then the economy is close or at potential GDP and will be experiencing rising price levels or inflationary pressures, but will have a low unemployment rate.

Equilibrium in the Aggregate Demand/Aggregate Supply Model

The intersection of the aggregate supply and aggregate demand curves shows the equilibrium level of real GDP and the equilibrium price level in the economy. At a relatively low price level for output, firms have little incentive to produce, although consumers would be willing to purchase a high quantity. As the price level for outputs rises, aggregate supply rises and aggregate demand falls until the equilibrium point is reached.

[link] combines the AS curve from [link] and the AD curve from [link] and places them both on a single diagram. In this example, the equilibrium point occurs at point E, at a price level of 90 and an output level of 8,800.

Aggregate Supply and Aggregate Demand



The equilibrium, where aggregate supply (AS) equals aggregate demand (AD), occurs at a price level of 90 and an output level of 8,800.

Confusion sometimes arises between the aggregate supply and aggregate demand model and the microeconomic analysis of demand and supply in particular markets for goods, services, labor, and capital. Read the following Clear It Up feature to gain an understanding of whether AS and AD are macro or micro.

Note:

Are AS and AD macro or micro?

These aggregate supply and aggregate demand model and the microeconomic analysis of demand and supply in particular markets for goods, services, labor, and capital have a superficial resemblance, but they also have many underlying differences.

For example, the vertical and horizontal axes have distinctly different meanings in macroeconomic and microeconomic diagrams. The vertical axis of a microeconomic demand and supply diagram expresses a price (or wage or rate of return) for an individual good or service. This price is implicitly relative: it is intended to be compared with the prices of other products (for example, the price of pizza relative to the price of fried chicken). In contrast, the vertical axis of an aggregate supply and aggregate demand diagram expresses the level of a price index like the Consumer Price Index or the GDP deflator—combining a wide array of prices from across the economy. The price level is absolute: it is not intended to be compared to any other prices since it is essentially the average price of all products in an economy. The horizontal axis of a microeconomic supply and demand curve measures the quantity of a particular good or service. In contrast, the horizontal axis of the aggregate demand and aggregate supply diagram measures GDP, which is the sum of all the final goods and services produced in the economy, not the quantity in a specific market.

In addition, the economic reasons for the shapes of the curves in the macroeconomic model are different from the reasons behind the shapes of the curves in microeconomic models. Demand curves for individual goods or services slope down primarily because of the existence of substitute goods, not the wealth effects, interest rate, and foreign price effects associated with aggregate demand curves. The slopes of individual supply

and demand curves can have a variety of different slopes, depending on the extent to which quantity demanded and quantity supplied react to price in that specific market, but the slopes of the AS and AD curves are much the same in every diagram (although as we shall see in later chapters, short-run and long-run perspectives will emphasize different parts of the AS curve). In short, just because the AD/AS diagram has two lines that cross, do not assume that it is the same as every other diagram where two lines cross. The intuitions and meanings of the macro and micro diagrams are only distant cousins from different branches of the economics family tree.

Defining SRAS and LRAS

In the Clear It Up feature titled “Why does AS cross potential GDP?” we differentiated between short run changes in aggregate supply which are shown by the AS curve and long run changes in aggregate supply which are defined by the vertical line at potential GDP. In the short run, if demand is too low (or too high), it is possible for producers to supply less GDP (or more GDP) than potential. In the long run, however, producers are limited to producing at potential GDP. For this reason, what we have been calling the AS curve, will from this point on may also be referred to as the **short run aggregate supply (SRAS) curve**. The vertical line at potential GDP may also be referred to as the **long run aggregate supply (LRAS) curve**.

Key Concepts and Summary

The upward-sloping short run aggregate supply (SRAS) curve shows the positive relationship between the price level and the level of real GDP in the short run. Aggregate supply slopes up because when the price level for outputs increases, while the price level of inputs remains fixed, the opportunity for additional profits encourages more production. The aggregate supply curve is near-horizontal on the left and near-vertical on the right. In the long run, aggregate supply is shown by a vertical line at the level of potential output, which is the maximum level of output the economy can produce with its existing levels of workers, physical capital, technology, and economic institutions.

The downward-sloping aggregate demand (AD) curve shows the relationship between the price level for outputs and the quantity of total spending in the economy. It slopes down because of: (a) the wealth effect, which means that a higher price level leads to lower real wealth, which reduces the level of consumption; (b) the interest rate effect, which holds that a higher price level will mean a greater demand for money, which will tend to drive up interest rates and reduce investment spending; and (c) the foreign price effect, which holds that a rise in the price level will make domestic goods relatively more expensive, discouraging exports and encouraging imports.

Self-Check Questions

Exercise:

Problem:

The short run aggregate supply curve was constructed assuming that as the price of outputs increases, the price of inputs stays the same. How would an increase in the prices of important inputs, like energy, affect aggregate supply?

Solution:

Higher input prices make output less profitable, decreasing the desired supply. This is shown graphically as a leftward shift in the AS curve.

Exercise:

Problem:

In the AD/AS model, what prevents the economy from achieving equilibrium at potential output?

Solution:

Equilibrium occurs at the level of GDP where AD = AS. Insufficient aggregate demand could explain why the equilibrium occurs at a level

of GDP less than potential. A decrease (or leftward shift) in aggregate supply could be another reason.

Review Questions

Exercise:

Problem:

What is on the horizontal axis of the AD/AS diagram? What is on the vertical axis?

Exercise:

Problem:

What is the economic reason why the SRAS curve slopes up?

Exercise:

Problem:

What are the components of the aggregate demand (AD) curve?

Exercise:

Problem:

What are the economic reasons why the AD curve slopes down?

Exercise:

Problem:

Briefly explain the reason for the near-horizontal shape of the SRAS curve on its far left.

Exercise:

Problem:

Briefly explain the reason for the near-vertical shape of the SRAS curve on its far right.

Exercise:

Problem: What is potential GDP?

Critical Thinking Questions

Exercise:

Problem:

On a microeconomic demand curve, a decrease in price causes an increase in quantity demanded because the product in question is now relatively less expensive than substitute products. Explain why aggregate demand does not increase for the same reason in response to a decrease in the aggregate price level. In other words, what causes total spending to increase if it is not because goods are now cheaper?

Problems

Exercise:

Problem:

Review the problem shown in the Work It Out titled "Interpreting the AD/AS Model." Like the information provided in that feature, [link] shows information on aggregate supply, aggregate demand, and the price level for the imaginary country of Xurbia.

Price Level	AD	AS
110	700	600

Price Level	AD	AS
120	690	640
130	680	680
140	670	720
150	660	740
160	650	760
170	640	770

Price Level: AD/AS

a. Plot the AD/AS diagram from the data shown. Identify the equilibrium.
b. Imagine that, as a result of a government tax cut, aggregate demand becomes higher by 50 at every price level. Identify the new equilibrium.
c. How will the new equilibrium alter output? How will it alter the price level? What do you think will happen to employment?

Exercise:

Problem:

The imaginary country of Harris Island has the aggregate supply and aggregate demand curves as shown in [link].

Price Level	AD	AS

Price Level	AD	AS
100	700	200
120	600	325
140	500	500
160	400	570
180	300	620

Price Level: AD/AS

a. Plot the AD/AS diagram. Identify the equilibrium.
b. Would you expect unemployment in this economy to be relatively high or low?
c. Would you expect concern about inflation in this economy to be relatively high or low?
d. Imagine that consumers begin to lose confidence about the state of the economy, and so AD becomes lower by 275 at every price level. Identify the new aggregate equilibrium.
e. How will the shift in AD affect the original output, price level, and employment?

Exercise:

Problem: Santher is an economy described by [link].

Price Level	AD	AS

Price Level	AD	AS
50	1,000	250
60	950	580
70	900	750
80	850	850
90	800	900

Price Level: AD/AS

a. Plot the AD/AS curves and identify the equilibrium.
b. Would you expect unemployment in this economy to be relatively high or low?
c. Would you expect prices to be a relatively large or small concern for this economy?
d. Imagine that input prices fall and so AS shifts to the right by 150 units. Identify the new equilibrium.
e. How will the shift in AS affect the original output, price level, and employment?

Glossary

aggregate demand (AD)
: the amount of total spending on domestic goods and services in an economy

aggregate supply (AS)
: the total quantity of output (i.e. real GDP) firms will produce and sell

aggregate demand (AD) curve
: the total spending on domestic goods and services at each price level

aggregate supply (AS) curve
: the total quantity of output (i.e. real GDP) that firms will produce and sell at each price level

aggregate demand/aggregate supply model
: a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level

full-employment GDP
: another name for potential GDP, when the economy is producing at its potential and unemployment is at the natural rate of unemployment

long run aggregate supply (LRAS) curve
: vertical line at potential GDP showing no relationship between the price level for output and real GDP in the long run

potential GDP
: the maximum quantity that an economy can produce given full employment of its existing levels of labor, physical capital, technology, and institutions

short run aggregate supply (SRAS) curve
: positive short run relationship between the price level for output and real GDP, holding the prices of inputs fixed

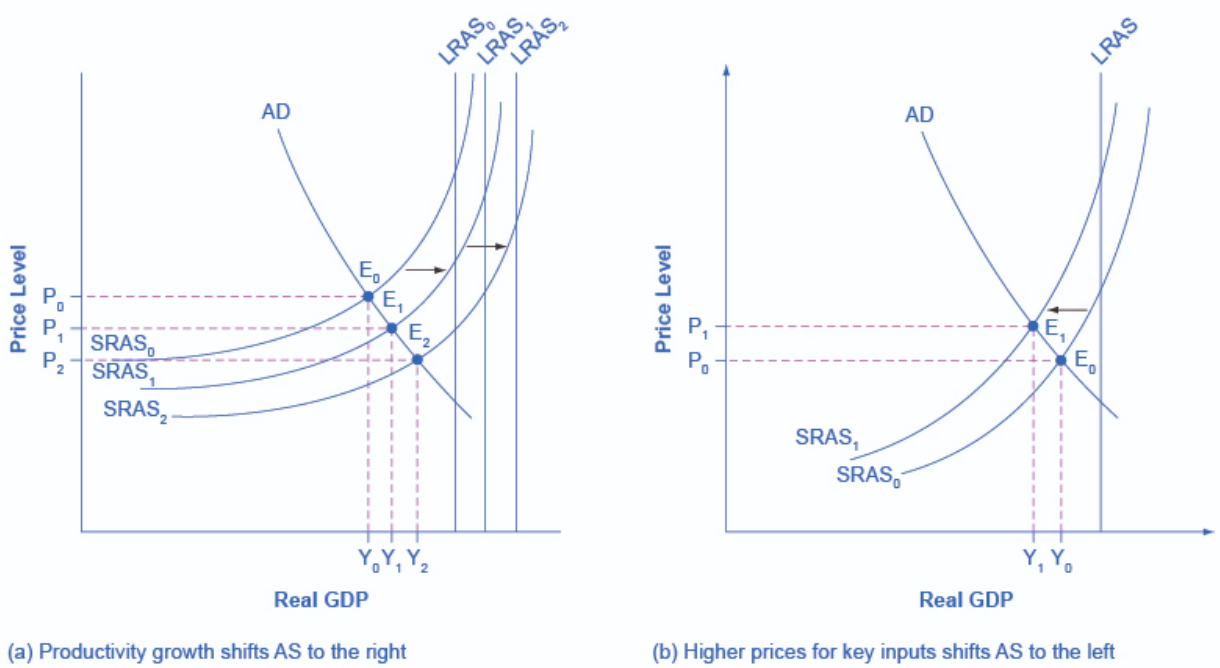
Shifts in Aggregate Supply
By the end of this section, you will be able to:

- Explain how productivity growth changes the aggregate supply curve
- Explain how changes in input prices changes the aggregate supply curve

The original equilibrium in the AD/AS diagram will shift to a new equilibrium if the AS or AD curve shifts. When the aggregate supply curve shifts to the right, then at every price level, a greater quantity of real GDP is produced. When the SRAS curve shifts to the left, then at every price level, a lower quantity of real GDP is produced. This module discusses two of the most important factors that can lead to shifts in the AS curve: productivity growth and input prices.

How Productivity Growth Shifts the AS Curve

In the long run, the most important factor shifting the AS curve is productivity growth. Productivity means how much output can be produced with a given quantity of labor. One measure of this is output per worker or GDP per capita. Over time, productivity grows so that the same quantity of labor can produce more output. Historically, the real growth in GDP per capita in an advanced economy like the United States has averaged about 2% to 3% per year, but productivity growth has been faster during certain extended periods like the 1960s and the late 1990s through the early 2000s, or slower during periods like the 1970s. A higher level of productivity shifts the AS curve to the right, because with improved productivity, firms can produce a greater quantity of output at every price level. [link] (a) shows an outward shift in productivity over two time periods. The AS curve shifts out from $SRAS_0$ to $SRAS_1$ to $SRAS_2$, reflecting the rise in potential GDP in this economy, and the equilibrium shifts from E_0 to E_1 to E_2.
Shifts in Aggregate Supply



(a) The rise in productivity causes the SRAS curve to shift to the right. The original equilibrium E_0 is at the intersection of AD and $SRAS_0$. When SRAS shifts right, then the new equilibrium E_1 is at the intersection of AD and $SRAS_1$, and then yet another equilibrium, E_2, is at the intersection of AD and $SRAS_2$. Shifts in SRAS to the right, lead to a greater level of output and to downward pressure on the price level. (b) A higher price for inputs means that at any given price level for outputs, a lower quantity will be produced so aggregate supply will shift to the left from $SRAS_0$ to AS_1. The new equilibrium, E_1, has a reduced quantity of output and a higher price level than the original equilibrium (E_0).

A shift in the SRAS curve to the right will result in a greater real GDP and downward pressure on the price level, if aggregate demand remains unchanged. However, if this shift in SRAS results from gains in productivity growth, which are typically measured in terms of a few percentage points per year, the effect will be relatively small over a few months or even a couple of years.

How Changes in Input Prices Shift the AS Curve

Higher prices for inputs that are widely used across the entire economy can have a macroeconomic impact on aggregate supply. Examples of such widely used inputs include wages and energy products. Increases in the price of such inputs will cause the SRAS curve to shift to the left, which means that at each given price level for outputs, a higher price for inputs will discourage production because it will reduce the possibilities for earning profits. [link] (b) shows the aggregate supply curve shifting to the left, from $SRAS_0$ to $SRAS_1$, causing the equilibrium to move from E_0 to E_1. The movement from the original equilibrium of E_0 to the new equilibrium of E_1 will bring a nasty set of effects: reduced GDP or recession, higher unemployment because the economy is now further away from potential GDP, and an inflationary higher price level as well. For example, the U.S. economy experienced recessions in 1974–1975, 1980–1982, 1990–91, 2001, and 2007–2009 that were each preceded or accompanied by a rise in the key input of oil prices. In the 1970s, this pattern of a shift to the left in SRAS leading to a stagnant economy with high unemployment and inflation was nicknamed **stagflation**.

Conversely, a decline in the price of a key input like oil will shift the SRAS curve to the right, providing an incentive for more to be produced at every given price level for outputs. From 1985 to 1986, for example, the average price of crude oil fell by almost half, from $24 a barrel to $12 a barrel. Similarly, from 1997 to 1998, the price of a barrel of crude oil dropped from $17 per barrel to $11 per barrel. In both cases, the plummeting price of oil led to a situation like that presented earlier in [link] (a), where the outward shift of SRAS to the right allowed the economy to expand, unemployment to fall, and inflation to decline.

Along with energy prices, two other key inputs that may shift the SRAS curve are the cost of labor, or wages, and the cost of imported goods that are used as inputs for other products. In these cases as well, the lesson is that lower prices for inputs cause SRAS to shift to the right, while higher prices cause it to shift back to the left.

Other Supply Shocks

The aggregate supply curve can also shift due to shocks to input goods or labor. For example, an unexpected early freeze could destroy a large number of agricultural crops, a shock that would shift the AS curve to the left since there would be fewer agricultural products available at any given price.

Similarly, shocks to the labor market can affect aggregate supply. An extreme example might be an overseas war that required a large number of workers to cease their ordinary production in order to go fight for their country. In this case, aggregate supply would shift to the left because there would be fewer workers available to produce goods at any given price.

Key Concepts and Summary

The aggregate demand/aggregate supply (AD/AS) diagram shows how AD and AS interact. The intersection of the AD and AS curves shows the equilibrium output and price level in the economy. Movements of either AS or AD will result in a different equilibrium output and price level. The aggregate supply curve will shift out to the right as productivity increases. It will shift back to the left as the price of key inputs rises, and will shift out to the right if the price of key inputs falls. If the AS curve shifts back to the left, the combination of lower output, higher unemployment, and higher inflation, called stagflation, occurs. If AS shifts out to the right, a combination of lower inflation, higher output, and lower unemployment is possible.

Self-Check Questions

Exercise:

Problem:

Suppose the U.S. Congress passes significant immigration reform that makes it easier for foreigners to come to the United States to work. Use the AD/AS model to explain how this would affect the equilibrium level of GDP and the price level.

Solution:

Immigration reform as described should increase the labor supply, shifting SRAS to the right, leading to a higher equilibrium GDP and a lower price level.

Exercise:

Problem:

Suppose concerns about the size of the federal budget deficit lead the U.S. Congress to cut all funding for research and development for ten years. Assuming this has an impact on technology growth, what does the AD/AS model predict would be the likely effect on equilibrium GDP and the price level?

Solution:

Given the assumptions made here, the cuts in R&D funding should reduce productivity growth. The model would show this as a leftward shift in the SRAS curve, leading to a lower equilibrium GDP and a higher price level.

Review Questions

Exercise:

Problem:

Name some factors that could cause the SRAS curve to shift, and say whether they would shift SRAS to the right or to the left.

Exercise:

Problem:

Will the shift of SRAS to the right tend to make the equilibrium quantity and price level higher or lower? What about a shift of SRAS to the left?

Exercise:

Problem: What is stagflation?

Critical Thinking Questions

Exercise:

Problem:

Economists expect that as the labor market continues to tighten going into the latter part of 2015 that workers should begin to expect wage increases in 2015 and 2016. Assuming this occurs and it was the only development in the labor market that year, how would this affect the AS curve? What if it was also accompanied by an increase in worker productivity?

Exercise:

Problem:

If new government regulations require firms to use a cleaner technology that is also less efficient than what was previously used, what would the effect be on output, the price level, and employment using the AD/AS diagram?

Exercise:

Problem:

During the spring of 2016 the Midwestern United States, which has a large agricultural base, experiences above-average rainfall. Using the AD/AS diagram, what is the effect on output, the price level, and employment?

Exercise:

Problem:

Hydraulic fracturing (fracking) has the potential to significantly increase the amount of natural gas produced in the United States. If a large percentage of factories and utility companies use natural gas, what will happen to output, the price level, and employment as fracking becomes more widely used?

Exercise:

Problem:

Some politicians have suggested tying the minimum wage to the consumer price index (CPI). Using the AD/AS diagram, what effects would this policy most likely have on output, the price level, and employment?

Glossary

stagflation
: an economy experiences stagnant growth and high inflation at the same time

Shifts in Aggregate Demand

By the end of this section, you will be able to:

- Explain how imports influence aggregate demand
- Identify ways in which business confidence and consumer confidence can affect aggregate demand
- Explain how government policy can change aggregate demand
- Evaluate why economists disagree on the topic of tax cuts

As mentioned previously, the components of aggregate demand are consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M). (Read the following Clear It Up feature for explanation of why imports are subtracted from exports and what this means for aggregate demand.) A shift of the AD curve to the right means that at least one of these components increased so that a greater amount of total spending would occur at every price level. A shift of the AD curve to the left means that at least one of these components decreased so that a lesser amount of total spending would occur at every price level. The Keynesian Perspective will discuss the components of aggregate demand and the factors that affect them. Here, the discussion will sketch two broad categories that could cause AD curves to shift: changes in the behavior of consumers or firms and changes in government tax or spending policy.

Note:

Do imports diminish aggregate demand?

We have seen that the formula for aggregate demand is AD = C + I + G + X - M, where M is the total value of imported goods. Why is there a minus sign in front of imports? Does this mean that more imports will result in a lower level of aggregate demand?

When an American buys a foreign product, for example, it gets counted along with all the other consumption. So the income generated does not go to American producers, but rather to producers in another country; it would be wrong to count this as part of domestic demand. Therefore, imports added in consumption are subtracted back out in the M term of the equation.

Because of the way in which the demand equation is written, it is easy to make the mistake of thinking that imports are bad for the economy. Just keep in mind that every negative number in the M term has a corresponding positive number in the C or I or G term, and they always cancel out.

How Changes by Consumers and Firms Can Affect AD

When consumers feel more confident about the future of the economy, they tend to consume more. If business confidence is high, then firms tend to spend more on investment, believing that the future payoff from that investment will be substantial. Conversely, if consumer or business confidence drops, then consumption and investment spending decline.

The University of Michigan publishes a survey of consumer confidence and constructs an index of consumer confidence each month. The survey results are then reported at http://www.sca.isr.umich.edu, which break down the change in consumer confidence among different income levels. According to that index, consumer confidence averaged around 90 prior to the Great Recession, and then it fell to below 60 in late 2008, which was the lowest it had been since 1980. Since then, confidence has climbed from a 2011 low of 55.8 back to a level in the low 80s, which is considered close to being considered a healthy state.

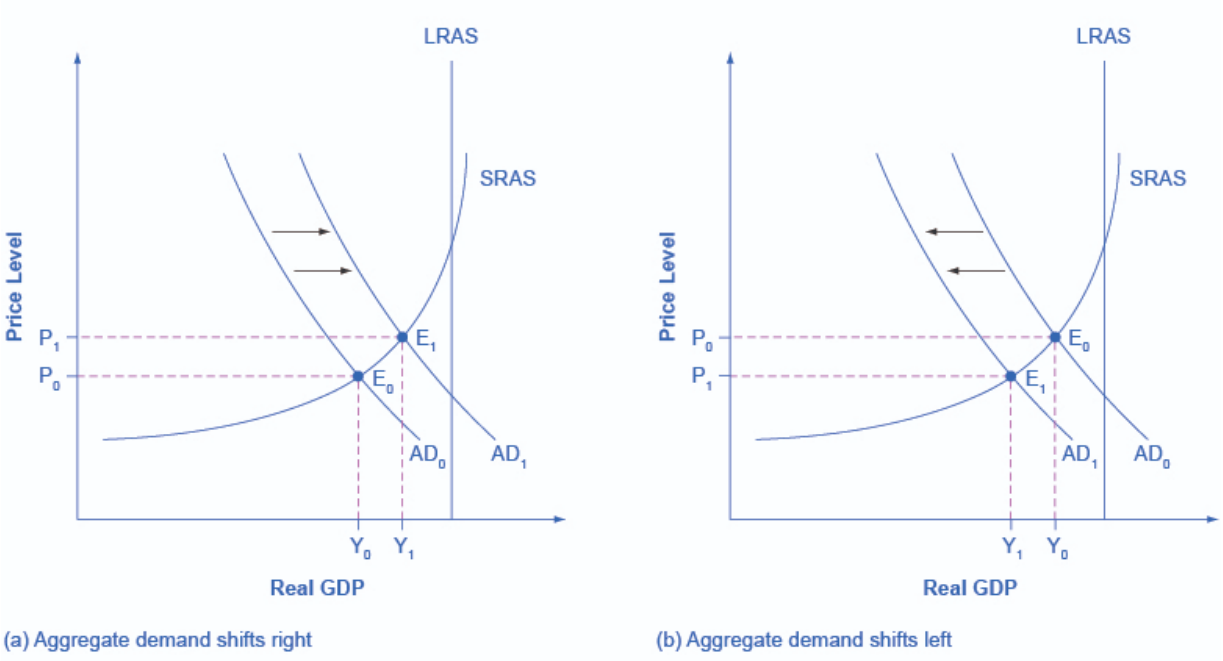
One measure of business confidence is published by the OECD: the "business tendency surveys". Business opinion survey data are collected for 21 countries on future selling prices and employment, among other elements of the business climate. After sharply declining during the Great Recession, the measure has risen above zero again and is back to long-term averages (the indicator dips below zero when business outlook is weaker than usual). Of course, either of these survey measures is not very precise. They can however, suggest when confidence is rising or falling, as well as when it is relatively high or low compared to the past.

Because a rise in confidence is associated with higher consumption and investment demand, it will lead to an outward shift in the AD curve, and a

move of the equilibrium, from E_0 to E_1, to a higher quantity of output and a higher price level, as shown in [link] (a).

Consumer and business confidence often reflect macroeconomic realities; for example, confidence is usually high when the economy is growing briskly and low during a recession. However, economic confidence can sometimes rise or fall for reasons that do not have a close connection to the immediate economy, like a risk of war, election results, foreign policy events, or a pessimistic prediction about the future by a prominent public figure. U.S. presidents, for example, must be careful in their public pronouncements about the economy. If they offer economic pessimism, they risk provoking a decline in confidence that reduces consumption and investment and shifts AD to the left, and in a self-fulfilling prophecy, contributes to causing the recession that the president warned against in the first place. A shift of AD to the left, and the corresponding movement of the equilibrium, from E_0 to E_1, to a lower quantity of output and a lower price level, is shown in [link] (b).

Shifts in Aggregate Demand



(a) An increase in consumer confidence or business confidence can shift AD to the right, from AD_0 to AD_1. When AD shifts to the right, the new equilibrium (E_1) will have a higher quantity of output and also a higher price level compared with the original equilibrium (E_0). In

this example, the new equilibrium (E_1) is also closer to potential GDP. An increase in government spending or a cut in taxes that leads to a rise in consumer spending can also shift AD to the right. (b) A decrease in consumer confidence or business confidence can shift AD to the left, from AD_0 to AD_1. When AD shifts to the left, the new equilibrium (E_1) will have a lower quantity of output and also a lower price level compared with the original equilibrium (E_0). In this example, the new equilibrium (E_1) is also farther below potential GDP. A decrease in government spending or higher taxes that leads to a fall in consumer spending can also shift AD to the left.

How Government Macroeconomic Policy Choices Can Shift AD

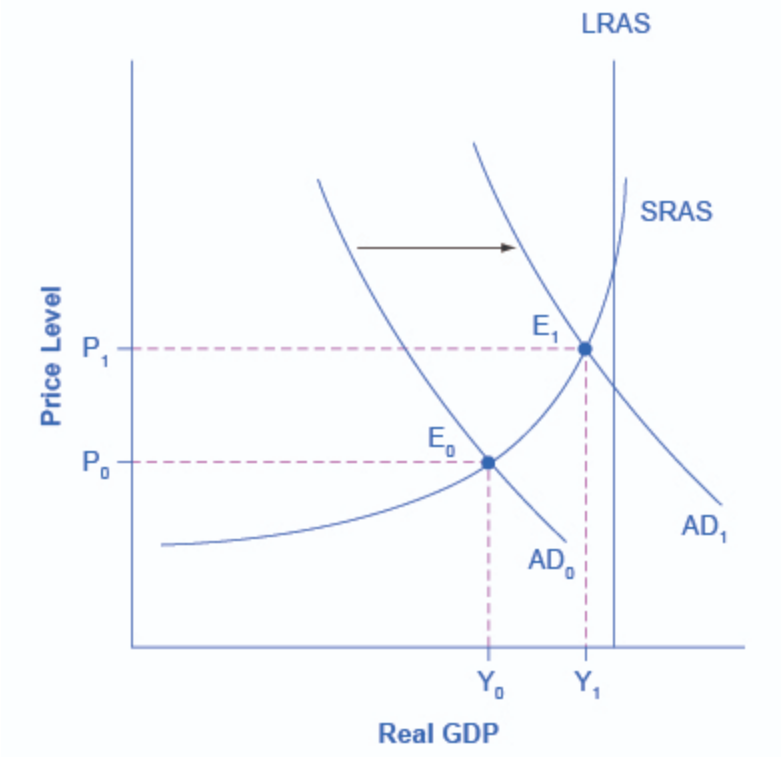
Government spending is one component of AD. Thus, higher government spending will cause AD to shift to the right, as in [link] (a), while lower government spending will cause AD to shift to the left, as in [link] (b). For example, in the United States, government spending declined by 3.2% of GDP during the 1990s, from 21% of GDP in 1991, and to 17.8% of GDP in 1998. However, from 2005 to 2009, the peak of the Great Recession, government spending increased from 19% of GDP to 21.4% of GDP. If changes of a few percentage points of GDP seem small to you, remember that since GDP was about $14.4 trillion in 2009, a seemingly small change of 2% of GDP is equal to close to $300 billion.

Tax policy can affect consumption and investment spending, too. Tax cuts for individuals will tend to increase consumption demand, while tax increases will tend to diminish it. Tax policy can also pump up investment demand by offering lower tax rates for corporations or tax reductions that benefit specific kinds of investment. Shifting C or I will shift the AD curve as a whole.

During a recession, when unemployment is high and many businesses are suffering low profits or even losses, the U.S. Congress often passes tax cuts. During the recession of 2001, for example, a tax cut was enacted into law.

At such times, the political rhetoric often focuses on how people going through hard times need relief from taxes. The aggregate supply and aggregate demand framework, however, offers a complementary rationale, as illustrated in [link]. The original equilibrium during a recession is at point E_0, relatively far from the full employment level of output. The tax cut, by increasing consumption, shifts the AD curve to the right. At the new equilibrium (E_1), real GDP rises and unemployment falls and, because in this diagram the economy has not yet reached its potential or full employment level of GDP, any rise in the price level remains muted. Read the following Clear It Up feature to consider the question of whether economists favor tax cuts or oppose them.

Recession and Full Employment in the AD/AS Model



Whether the economy is in a recession is illustrated in the AD/AS model by how close the equilibrium is to the potential GDP line as indicated by the vertical LRAS line. In this example, the level of output Y_0 at the equilibrium E_0 is relatively far from the potential GDP line, so it can

represent an economy in recession, well below the full employment level of GDP. In contrast, the level of output Y_1 at the equilibrium E_1 is relatively close to potential GDP, and so it would represent an economy with a lower unemployment rate.

Note:

Do economists favor tax cuts or oppose them?

One of the most fundamental divisions in American politics over the last few decades has been between those who believe that the government should cut taxes substantially and those who disagree. Ronald Reagan rode into the presidency in 1980 partly because of his promise, soon carried out, to enact a substantial tax cut. George Bush lost his bid for reelection against Bill Clinton in 1992 partly because he had broken his 1988 promise: “Read my lips! No new taxes!” In the 2000 presidential election, both George W. Bush and Al Gore advocated substantial tax cuts and Bush succeeded in pushing a package of tax cuts through Congress early in 2001. Disputes over tax cuts often ignite at the state and local level as well. What side are economists on? Do they support broad tax cuts or oppose them? The answer, unsatisfying to zealots on both sides, is that it depends. One issue is whether the tax cuts are accompanied by equally large government spending cuts. Economists differ, as does any broad cross-section of the public, on how large government spending should be and what programs might be cut back. A second issue, more relevant to the discussion in this chapter, concerns how close the economy is to the full employment level of output. In a recession, when the intersection of the AD and AS curves is far below the full employment level, tax cuts can make sense as a way of shifting AD to the right. However, when the economy is already doing extremely well, tax cuts may shift AD so far to the right as to generate inflationary pressures, with little gain to GDP. With the AD/AS framework in mind, many economists might readily believe that the Reagan tax cuts of 1981, which took effect just after two

serious recessions, were beneficial economic policy. Similarly, the Bush tax cuts of 2001 and the Obama tax cuts of 2009 were enacted during recessions. However, some of the same economists who favor tax cuts in time of recession would be much more dubious about identical tax cuts at a time the economy is performing well and cyclical unemployment is low.

The use of government spending and tax cuts can be a useful tool to affect aggregate demand and it will be discussed in greater detail in the Government Budgets and Fiscal Policy chapter and The Impacts of Government Borrowing. Other policy tools can shift the aggregate demand curve as well. For example, as discussed in the Monetary Policy and Bank Regulation chapter, the Federal Reserve can affect interest rates and the availability of credit. Higher interest rates tend to discourage borrowing and thus reduce both household spending on big-ticket items like houses and cars and investment spending by business. Conversely, lower interest rates will stimulate consumption and investment demand. Interest rates can also affect exchange rates, which in turn will have effects on the export and import components of aggregate demand.

Spelling out the details of these alternative policies and how they affect the components of aggregate demand can wait for The Keynesian Perspective chapter. Here, the key lesson is that a shift of the aggregate demand curve to the right leads to a greater real GDP and to upward pressure on the price level. Conversely, a shift of aggregate demand to the left leads to a lower real GDP and a lower price level. Whether these changes in output and price level are relatively large or relatively small, and how the change in equilibrium relates to potential GDP, depends on whether the shift in the AD curve is happening in the relatively flat or relatively steep portion of the AS curve.

Key Concepts and Summary

The AD curve will shift out as the components of aggregate demand—C, I, G, and X–M—rise. It will shift back to the left as these components fall. These factors can change because of different personal choices, like those

resulting from consumer or business confidence, or from policy choices like changes in government spending and taxes. If the AD curve shifts to the right, then the equilibrium quantity of output and the price level will rise. If the AD curve shifts to the left, then the equilibrium quantity of output and the price level will fall. Whether equilibrium output changes relatively more than the price level or whether the price level changes relatively more than output is determined by where the AD curve intersects with the AS curve.

The AD/AS diagram superficially resembles the microeconomic supply and demand diagram on the surface, but in reality, what is on the horizontal and vertical axes and the underlying economic reasons for the shapes of the curves are very different. Long-term economic growth is illustrated in the AD/AS framework by a gradual shift of the aggregate supply curve to the right. A recession is illustrated when the intersection of AD and AS is substantially below potential GDP, while an expanding economy is illustrated when the intersection of AS and AD is near potential GDP.

Self-Check Questions

Exercise:

Problem:

How would a dramatic increase in the value of the stock market shift the AD curve? What effect would the shift have on the equilibrium level of GDP and the price level?

Solution:

An increase in the value of the stock market would make individuals feel wealthier and thus more confident about their economic situation. This would likely cause an increase in consumer confidence leading to an increase in consumer spending, shifting the AD curve to the right. The result would be an increase in the equilibrium level of GDP and an increase in the price level.

Exercise:

Problem:

Suppose Mexico, one of our largest trading partners and purchaser of a large quantity of our exports, goes into a recession. Use the AD/AS model to determine the likely impact on our equilibrium GDP and price level.

Solution:

Since imports depend on GDP, if Mexico goes into recession, its GDP declines and so do its imports. This decline in our exports can be shown as a leftward shift in AD, leading to a decrease in our GDP and price level.

Exercise:

Problem:

A policymaker claims that tax cuts led the economy out of a recession. Can we use the AD/AS diagram to show this?

Solution:

Tax cuts increase consumer and investment spending, depending on where the tax cuts are targeted. This would shift AD to the right, so if the tax cuts occurred when the economy was in recession (and GDP was less than potential), the tax cuts would increase GDP and "lead the economy out of recession."

Exercise:

Problem:

Many financial analysts and economists eagerly await the press releases for the reports on the home price index and consumer confidence index. What would be the effects of a negative report on both of these? What about a positive report?

Solution:

A negative report on home prices would make consumers feel like the value of their homes, which for most Americans is a major portion of their wealth, has declined. A negative report on consumer confidence would make consumers feel pessimistic about the future. Both of these would likely reduce consumer spending, shifting AD to the left, reducing GDP and the price level. A positive report on the home price index or consumer confidence would do the opposite.

Review Questions

Exercise:

Problem:

Name some factors that could cause AD to shift, and say whether they would shift AD to the right or to the left.

Exercise:

Problem:

Would a shift of AD to the right tend to make the equilibrium quantity and price level higher or lower? What about a shift of AD to the left?

Critical Thinking Questions

Exercise:

Problem:

If households decide to save a larger portion of their income, what effect would this have on the output, employment, and price level in the short run? What about the long run?

Exercise:

Problem:

If firms become more optimistic about the future of the economy and, at the same time, innovation in 3-D printing makes most workers more productive, what is the combined effect on output, employment, and the price-level?

Exercise:

Problem:

If Congress cuts taxes at the same time that businesses become more pessimistic about the economy, what is the combined effect on output, the price level, and employment using the AD/AS diagram?

How the AD/AS Model Incorporates Growth, Unemployment, and Inflation
By the end of this section, you will be able to:

- Identify periods of economic growth and recession using the aggregate demand/aggregate supply model
- Explain how unemployment and inflation impact the aggregate demand/aggregate supply model
- Evaluate the importance of the aggregate demand/aggregate supply model

The AD/AS model can convey a number of interlocking relationships between the four macroeconomic goals of growth, unemployment, inflation, and a sustainable balance of trade. Moreover, the AD/AS framework is flexible enough to accommodate both the Keynes' law approach that focuses on aggregate demand and the short run, while also including the Say's law approach that focuses on aggregate supply and the long run. These advantages are considerable. Every model is a simplified version of the deeper reality and, in the context of the AD/AS model, the three macroeconomic goals arise in ways that are sometimes indirect or incomplete. In this module, we consider how the AD/AS model illustrates the three macroeconomic goals of economic growth, low unemployment, and low inflation.

Growth and Recession in the AD/AS Diagram

In the AD/AS diagram, long-run economic growth due to productivity increases over time will be represented by a gradual shift to the right of aggregate supply. The vertical line representing potential GDP (or the "full employment level of GDP") will gradually shift to the right over time as well. A pattern of economic growth over three years, with the AS curve shifting slightly out to the right each year, was shown earlier in [link] (a). However, the factors that determine the speed of this long-term economic growth rate—like investment in physical and human capital, technology, and whether an economy can take advantage of catch-up growth—do not appear directly in the AD/AS diagram.

In the short run, GDP falls and rises in every economy, as the economy dips into recession or expands out of recession. Recessions are illustrated in the AD/AS diagram when the equilibrium level of real GDP is substantially below potential GDP, as occurred at the equilibrium point E_0 in [link]. On the other hand, in years of resurgent economic growth the equilibrium will typically be close to potential GDP, as shown at equilibrium point E_1 in that earlier figure.

Unemployment in the AD/AS Diagram

Two types of unemployment were described in the Unemployment chapter. Cyclical unemployment bounces up and down according to the short-run movements of GDP. Over the long run, in the United States, the unemployment rate typically hovers around 5% (give or take one percentage point or so), when the economy is healthy. In many of the national economies across Europe, the rate of unemployment in recent decades has only dropped to about 10% or a bit lower, even in good economic years. This baseline level of unemployment that occurs year-in and year-out is called the natural rate of unemployment and is determined by how well the structures of market and government institutions in the economy lead to a matching of workers and employers in the labor market. Potential GDP can imply different unemployment rates in different economies, depending on the natural rate of unemployment for that economy.

Note:
Visit this website for data on consumer confidence.



In the AD/AS diagram, cyclical unemployment is shown by how close the economy is to the potential or full employment level of GDP. Returning to [link], relatively low cyclical unemployment for an economy occurs when the level of output is close to potential GDP, as in the equilibrium point E_1. Conversely, high cyclical unemployment arises when the output is substantially to the left of potential GDP on the AD/AS diagram, as at the equilibrium point E_0. The factors that determine the natural rate of unemployment are not shown separately in the AD/AS model, although they are implicitly part of what determines potential GDP or full employment GDP in a given economy.

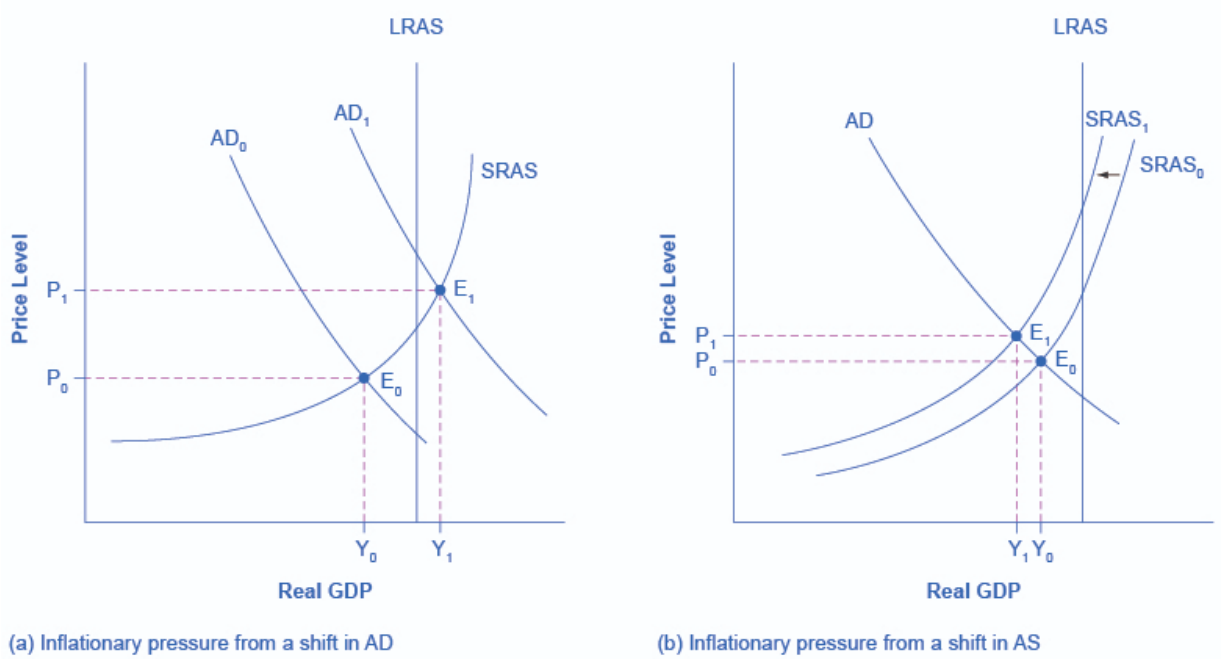
Inflationary Pressures in the AD/AS Diagram

Inflation fluctuates in the short run. Higher inflation rates have typically occurred either during or just after economic booms: for example, the biggest spurts of inflation in the U.S. economy during the twentieth century followed the wartime booms of World War I and World War II. Conversely, rates of inflation generally decline during recessions. As an extreme example, inflation actually became negative—a situation called "deflation"—during the Great Depression. Even during the relatively short recession of 1991–1992, the rate of inflation declined from 5.4% in 1990 to 3.0% in 1992. During the relatively short recession of 2001, the rate of inflation declined from 3.4% in 2000 to 1.6% in 2002. During the deep recession of 2007–2009, the rate of inflation declined from 3.8% in 2008 to –0.4% in 2009. Some countries have experienced bouts of high inflation that lasted for years. In the U.S. economy since the mid–1980s, inflation does not seem to have had any long-term trend to be substantially higher or lower; instead, it has stayed in the range of 1–5% annually.

Note:
Visit this website for data on business confidence.

The AD/AS framework implies two ways that inflationary pressures may arise. One possible trigger is if aggregate demand continues to shift to the right when the economy is already at or near potential GDP and full employment, thus pushing the macroeconomic equilibrium into the steep portion of the AS curve. In [link] (a), there is a shift of aggregate demand to the right; the new equilibrium E_1 is clearly at a higher price level than the original equilibrium E_0. In this situation, the aggregate demand in the economy has soared so high that firms in the economy are not capable of producing additional goods, because labor and physical capital are fully employed, and so additional increases in aggregate demand can only result in a rise in the price level.

Sources of Inflationary Pressure in the AD/AS Model



(a) A shift in aggregate demand, from AD_0 to AD_1, when it happens in the area of the SRAS curve that is near potential GDP, will lead to a higher price level and to pressure for a higher price level and inflation. The new equilibrium (E1) is at a higher price level (P1) than the original equilibrium. (b) A shift in aggregate supply, from $SRAS_0$ to $SRAS_1$, will lead to a lower real GDP and to pressure for a higher price level and inflation. The new equilibrium (E_1) is at a higher price level (P_1), while the original equilibrium (E_0) is at the lower price level (P_0).

An alternative source of inflationary pressures can occur due to a rise in input prices that affects many or most firms across the economy—perhaps an important input to production like oil or labor—and causes the aggregate supply curve to shift back to the left. In [link] (b), the shift of the SRAS curve to the left also increases the price level from P_0 at the original equilibrium (E_0) to a higher price level of P_1 at the new equilibrium (E_1). In effect, the rise in input prices ends up, after the final output is produced and sold, being passed along in the form of a higher price level for outputs.

The AD/AS diagram shows only a one-time shift in the price level. It does not address the question of what would cause inflation either to vanish after a year, or to sustain itself for several years. There are two explanations for why inflation may persist over time. One way that continual inflationary price increases can occur is if the government continually attempts to stimulate aggregate demand in a way that keeps pushing the AD curve when it is already in the steep portion of the SRAS curve. A second possibility is that, if inflation has been occurring for several years, a certain level of inflation may come to be expected. For example, if consumers, workers, and businesses all expect prices and wages to rise by a certain amount, then these expected rises in the price level can become built into the annual increases of prices, wages, and interest rates of the economy. These two reasons are interrelated, because if a government fosters a macroeconomic environment with inflationary pressures, then people will grow to expect inflation. However, the AD/AS diagram does not show these patterns of ongoing or expected inflation in a direct way.

Importance of the Aggregate Demand/Aggregate Supply Model

Macroeconomics takes an overall view of the economy, which means that it needs to juggle many different concepts. For example, start with the three macroeconomic goals of growth, low inflation, and low unemployment. Aggregate demand has four elements: consumption, investment, government spending, and exports less imports. Aggregate supply reveals how businesses throughout the economy will react to a higher price level for outputs. Finally, a wide array of economic events and policy decisions can affect aggregate demand and aggregate supply, including government tax and spending decisions; consumer and business confidence; changes in prices of key inputs like oil; and technology that brings higher levels of productivity.

The aggregate demand/aggregate supply model is one of the fundamental diagrams in this course (like the budget constraint diagram introduced in the Choice in a World of Scarcity chapter and the supply and demand diagram introduced in the Demand and Supply chapter) because it provides an overall framework for bringing these factors together in one diagram. Indeed, some version of the AD/AS model will appear in every chapter in the rest of this book.

Key Concepts and Summary

Cyclical unemployment is relatively large in the AD/AS framework when the equilibrium is substantially below potential GDP. Cyclical unemployment is small in the AD/AS framework when the equilibrium is near potential GDP. The natural rate of unemployment, as determined by the labor market institutions of the economy, is built into what is meant by potential GDP, but does not otherwise appear in an AD/AS diagram. Pressures for inflation to rise or fall are shown in the AD/AS framework when the movement from one equilibrium to another causes the price level to rise or to fall. The balance of trade does not appear directly in the AD/AS diagram, but it appears indirectly in several ways. Increases in exports or declines in imports can cause shifts in AD. Changes in the price of key imported inputs to production, like oil, can cause shifts in AS. The AD/AS

model is the key model used in this book to understand macroeconomic issues.

Self-Check Questions

Exercise:

Problem:

What impact would a decrease in the size of the labor force have on GDP and the price level according to the AD/AS model?

Solution:

A smaller labor force would be reflected in a leftward shift in AS, leading to a lower equilibrium level of GDP and higher price level.

Exercise:

Problem:

Suppose, after five years of sluggish growth, the economy of the European Union picks up speed. What would be the likely impact on the U.S. trade balance, GDP, and employment?

Solution:

Higher EU growth would increase demand for U.S. exports, reducing our trade deficit. The increased demand for exports would show up as a rightward shift in AD, causing GDP to rise (and the price level to rise as well). Higher GDP would require more jobs to fulfill, so U.S. employment would also rise.

Exercise:

Problem:

Suppose the Federal Reserve begins to increase the supply of money at an increasing rate. What impact would that have on GDP, unemployment, and inflation?

Solution:

Expansionary monetary policy shifts AD to the right. A continuing expansionary policy would cause larger and larger shifts (given the parameters of this problem). The result would be an increase in GDP and employment (a decrease in unemployment) and higher prices until potential output was reached. After that point, the expansionary policy would simply cause inflation.

Review Questions

Exercise:

Problem: How is long-term growth illustrated in an AD/AS model?

Exercise:

Problem: How is recession illustrated in an AD/AS model?

Exercise:

Problem:

How is cyclical unemployment illustrated in an AD/AS model?

Exercise:

Problem:

How is the natural rate of unemployment illustrated in an AD/AS model?

Exercise:

Problem:

How is pressure for inflationary price increases shown in an AD/AS model?

Exercise:

Problem:

What are some of the ways in which exports and imports can affect the AD/AS model?

Critical Thinking Questions

Exercise:

Problem:

Suppose the level of structural unemployment increases. How would the increase in structural unemployment be illustrated in the AD/AS model? *Hint*: How does structural unemployment affect potential GDP?

Exercise:

Problem:

If foreign wealth-holders decide that the United States is the safest place to invest their savings, what would the effect be on the economy here? Show graphically using the AD/AS model.

Exercise:

Problem:

The AD/AS model is static. It shows a snapshot of the economy at a given point in time. Both economic growth and inflation are dynamic phenomena. Suppose economic growth is 3% per year and aggregate demand is growing at the same rate. What does the AD/AS model say the inflation rate should be?

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Introduction to the Neoclassical Perspective
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Impact of the Great Recession

The impact of the Great Recession can be seen in many areas of the economy that impact our daily lives. One of the most visible signs can be seen in the housing market where many homes and other buildings are abandoned, including ones that midway through construction. (Credit: modification of work by A McLin/Flickr Creative Commons)



Note:

Navigating Unchartered Waters

The Great Recession ended in June 2009 after 18 months, according to the National Bureau of Economic Research (NBER). The NBER examines a variety of measures of economic activity to gauge the overall health of the economy. These measures include real income, wholesale and retail sales, employment, and industrial production. In the years since the official end of this historic economic downturn, it has become clear that the Great Recession was two-pronged, hitting the U.S. economy with the collapse of the housing market and the failure of the financial system's credit institutions, further contaminating global economies. While the stock market rapidly lost trillions of dollars of value, consumer spending dried up, and companies began cutting jobs, economic policymakers were struggling with how to best combat and prevent a national, and even global economic collapse. In the end, policymakers used a number of controversial monetary and fiscal policies to support the housing market and domestic industries as well as to stabilize the financial sector. Some of these initiatives included:

- Federal Reserve Bank purchase of both traditional and nontraditional assets off banks' balance sheets. By doing this, the Fed injected money into the banking system and increased the amounts of funds available to lend to the business sector and consumers. This also dropped short-term interest rates to as low as zero percent and had the effect of devaluing U.S. dollars in the global market and boosting exports.
- The Congress and the President also passed several pieces of legislation that would stabilize the financial market. The Troubled Asset Relief Program (TARP), passed in late 2008, allowed the government to inject cash into troubled banks and other financial institutions and help support General Motors and Chrysler as they faced bankruptcy and threatened job losses throughout their supply chain. The American Recovery and Reinvestment Act in early 2009 provided tax rebates to low- and middle-income households to encourage consumer spending.

Four years after the end of the Great Recession, the economy has yet to return to its pre-recession levels of productivity and growth. Annual productivity increased only 1.9% between 2009 and 2012 compared to its 2.7% annual growth rate between 2000 and 2007, unemployment remains above the natural rate, and real GDP continues to lag behind potential growth. The actions taken to stabilize the economy are still under scrutiny and debate about their effectiveness continues. In this chapter, we will discuss the neoclassical perspective on economics and compare it to the Keynesian perspective. At the end of the chapter, we will use the neoclassical perspective to analyze the actions taken in the Great Recession.

Note:

Introduction to the Neoclassical Perspective

In this chapter, you will learn about:

- The Building Blocks of Neoclassical Analysis
- The Policy Implications of the Neoclassical Perspective

- Balancing Keynesian and Neoclassical Models

In Chicago, Illinois, the highest recorded temperature was 105° in July 1995, while the lowest recorded temperature was 27° below zero in January 1958. Understanding why these extreme weather patterns occurred would be interesting. However, if you wanted to understand the typical weather pattern in Chicago, instead of focusing on one-time extremes, you would need to look at the entire pattern of data over time.

A similar lesson applies to the study of macroeconomics. It is interesting to study extreme situations, like the Great Depression of the 1930s or what many have called the Great Recession of 2008–2009. If you want to understand the whole picture, however, you need to look at the long term. Consider the unemployment rate. The unemployment rate has fluctuated from as low as 3.5% in 1969 to as high as 9.7% in 1982 and 9.6% in 2009. Even as the U.S. unemployment rate rose during recessions and declined during expansions, it kept returning to the general neighborhood of 5.0–5.5%. When the nonpartisan Congressional Budget Office carried out its long-range economic forecasts in 2010, it assumed that from 2015 to 2020, after the recession has passed, the unemployment rate would be 5.0%. From a long-run perspective, the economy seems to keep adjusting back to this rate of unemployment.

As the name “neoclassical” implies, this perspective of how the macroeconomy works is a “new” view of the “old” classical model of the economy. The classical view, the predominant economic philosophy until the Great Depression, was that short-term fluctuations in economic activity would rather quickly, with flexible prices, adjust back to full employment. This view of the economy implied a vertical aggregate supply curve at full employment GDP, and prescribed a “hands off” policy approach. For example, if the economy were to slip into recession (a leftward shift of the aggregate demand curve), it would temporarily exhibit a surplus of goods. This surplus would be eliminated with falling prices, and the economy would return to full employment level of GDP; no active fiscal or monetary policy was needed. In fact, the classical view was that expansionary fiscal

or monetary policy would only cause inflation, rather than increase GDP. The deep and lasting impact of the Great Depression changed this thinking and Keynesian economics, which prescribed active fiscal policy to alleviate weak aggregate demand, became the more mainstream perspective.

The Building Blocks of Neoclassical Analysis
By the end of this section, you will be able to:

- Explain the importance of potential GDP in the long run
- Analyze the role of flexible prices
- Interpret a neoclassical model of aggregate demand and aggregate supply
- Evaluate different ways for measuring the speed of macroeconomic adjustment

The **neoclassical perspective** on macroeconomics holds that, in the long run, the economy will fluctuate around its potential GDP and its natural rate of unemployment. This chapter begins with two building blocks of neoclassical economics: (1) the size of the economy is determined by potential GDP, and (2) wages and prices will adjust in a flexible manner so that the economy will adjust back to its potential GDP level of output. The key policy implication is this: Should the government focus more on long-term growth and on controlling inflation than on worrying about recession or cyclical unemployment? This focus on long-run growth rather than the short-run fluctuations in the business cycle means that neoclassical economics is more useful for long-run macroeconomic analysis and Keynesian economics is more useful for analyzing the macroeconomic short run. Let's consider the two neoclassical building blocks in turn, and how they can be embodied in the aggregate demand/aggregate supply model.

The Importance of Potential GDP in the Long Run

Over the long run, the level of potential GDP determines the size of real GDP. When economists refer to “potential GDP” they are referring to that level of output that can be achieved when all resources (land, labor, capital, and entrepreneurial ability) are fully employed. While the unemployment rate in labor markets will never be zero, full employment in the labor market refers to zero cyclical unemployment. There will still be some level of unemployment due to frictional or structural unemployment, but when the economy is operating with zero cyclical unemployment, the economy is said to be at the natural rate of unemployment or at full employment.

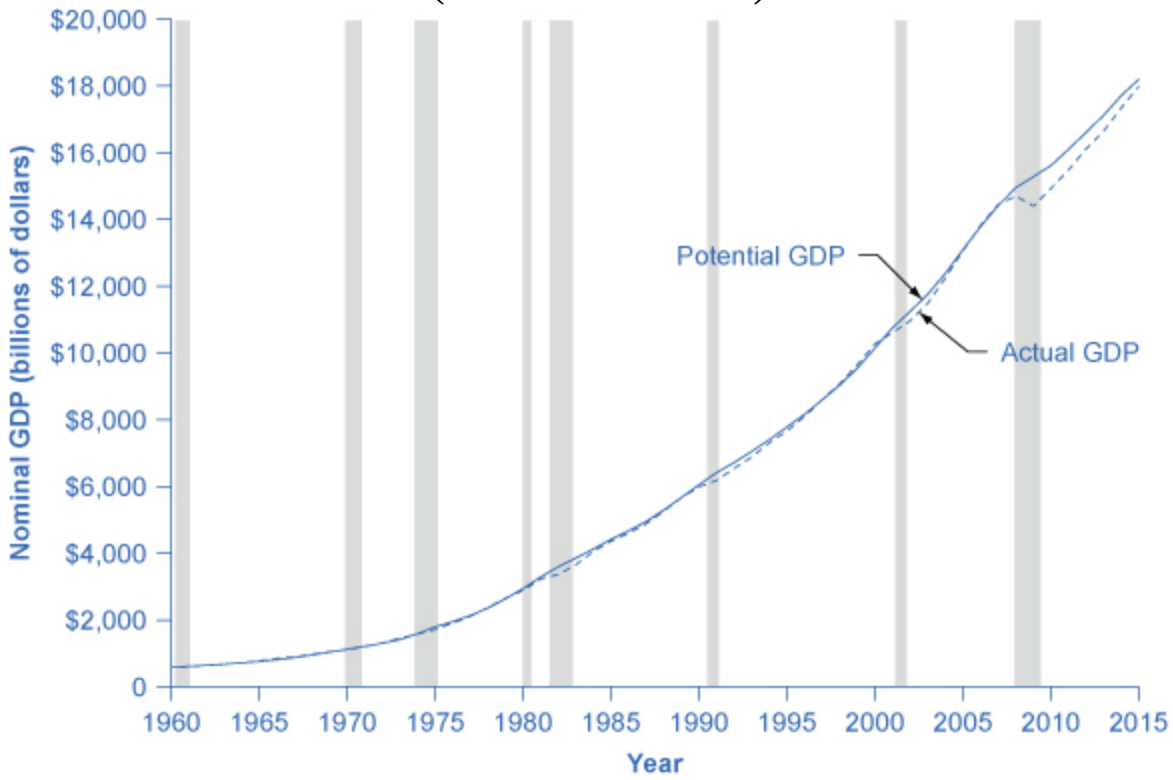
Actual or real GDP is benchmarked against the potential GDP to determine how well the economy is performing. Growth in GDP can be explained by increases and investment in physical capital and human capital per person as well as advances in technology. **Physical capital per person** refers to the amount and kind of machinery and equipment available to help people get work done. Compare, for example, your productivity in typing a term paper on a typewriter to working on your laptop with word processing software. Clearly, you will be able to be more productive using word processing software. The technology and level of capital of your laptop and software has increased your productivity. More broadly, the development of GPS technology and Universal Product Codes (those barcodes on every product we buy) has made it much easier for firms to track shipments, tabulate inventories, and sell and distribute products. These two technological innovations, and many others, have increased a nation's ability to produce goods and services for a given population. Likewise, increasing human capital involves increasing levels of knowledge, education, and skill sets per person through vocational or higher education. Physical and human capital improvements with technological advances will increase overall productivity and, thus, GDP.

To see how these improvements have increased productivity and output at the national level, we should examine evidence from the United States. The United States experienced significant growth in the twentieth century due to phenomenal changes in infrastructure, equipment, and technological improvements in physical capital and human capital. The population more than tripled in the twentieth century, from 76 million in 1900 to over 300 million in 2012. The human capital of modern workers is far higher today because the education and skills of workers have risen dramatically. In 1900, only about one-eighth of the U.S. population had completed high school and just one person in 40 had completed a four-year college degree. By 2010, more than 87% of Americans had a high school degree and over 29% had a four-year college degree as well. In 2014, 40% of working-age Americans had a four-year college degree. The average amount of physical capital per worker has grown dramatically. The technology available to modern workers is extraordinarily better than a century ago: cars, airplanes, electrical machinery, smartphones, computers, chemical and biological advances, materials science, health care—the list of technological advances

could run on and on. More workers, higher skill levels, larger amounts of physical capital per worker, and amazingly better technology, and potential GDP for the U.S. economy has clearly increased a great deal since 1900.

This growth has fallen below its potential GDP and, at times, has exceeded its potential. For example from 2008 to 2009, the U.S. economy tumbled into recession and remains below its potential. At other times, like in the late 1990s, the economy ran at potential GDP—or even slightly ahead. [link] shows the actual data for the increase in nominal GDP since 1960. The slightly smoother line shows the potential GDP since 1960 as estimated by the nonpartisan Congressional Budget Office. Most economic recessions and upswings are times when the economy is 1–3% below or above potential GDP in a given year. Clearly, short-run fluctuations around potential GDP do exist, but over the long run, the upward trend of potential GDP determines the size of the economy.

Potential and Actual GDP (in Nominal Dollars)

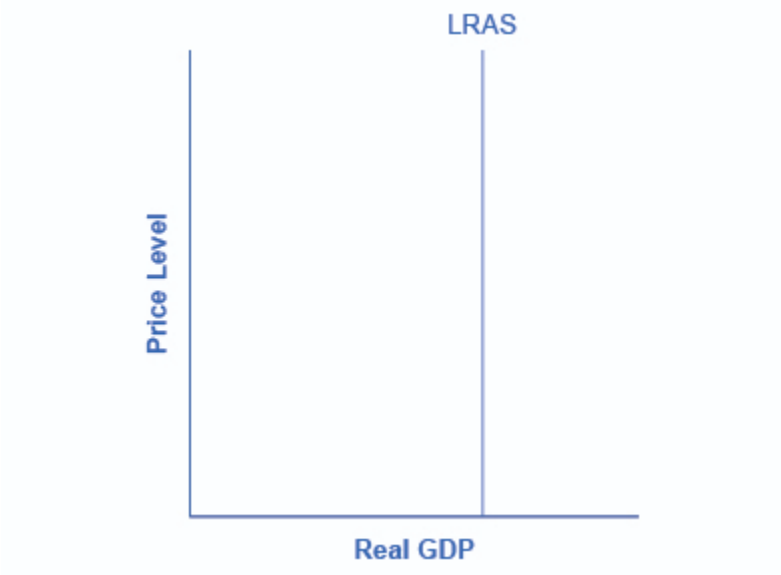


Actual GDP falls below potential GDP during and after recessions (gray shaded areas indicate US recessions). In other cases, actual GDP can be above potential GDP for a time, as in the late 1990s.

(Source: Federal Reserve Economic Data (FRED)
https://fred.stlouisfed.org/graph/?g=ef0J)

In the aggregate demand/aggregate supply model, potential GDP is shown as a vertical line. Neoclassical economists who focus on potential GDP as the primary determinant of real GDP argue that the long-run aggregate supply curve is located at potential GDP—that is, the long-run aggregate supply curve is a vertical line drawn at the level of potential GDP, as shown in [link]. A vertical LRAS curve means that the level of aggregate supply (or potential GDP) will determine the real GDP of the economy, regardless of the level of aggregate demand. Over time, increases in the quantity and quality of physical capital, increases in human capital, and technological advancements shift potential GDP and the vertical LRAS curve gradually to the right. This gradual increase in an economy's potential GDP is often described as a nation's long-term economic growth.

A Vertical AS Curve



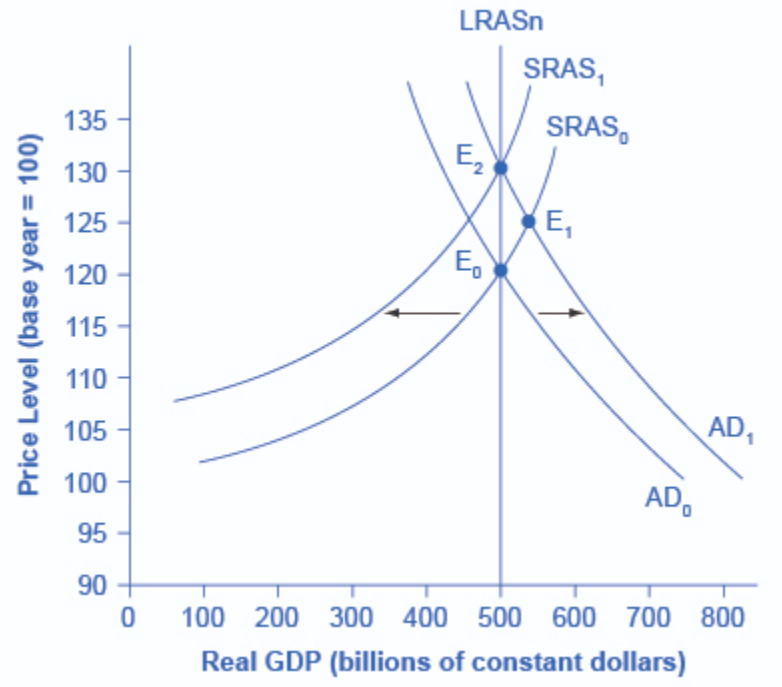
In the neoclassical model, the aggregate supply curve is drawn as a vertical line at the level of potential GDP. If AS is vertical, then it determines the level of real output, no matter where the aggregate demand

curve is drawn. Over time, the LRAS curve shifts to the right as productivity increases and potential GDP expands.

The Role of Flexible Prices

How does the macroeconomy adjust back to its level of potential GDP in the long run? What if aggregate demand increases or decreases? The neoclassical view of how the macroeconomy adjusts is based on the insight that even if wages and prices are “sticky”, or slow to change, in the short run, they are flexible over time. To understand this better, let's follow the connections from the short-run to the long-run macroeconomic equilibrium.

The aggregate demand and aggregate supply diagram shown in [link] shows two aggregate supply curves. The original upward sloping aggregate supply curve ($SRAS_0$) is a short-run or Keynesian AS curve. The vertical aggregate supply curve (LRASn) is the long-run or neoclassical AS curve, which is located at potential GDP. The original aggregate demand curve, labeled AD_0, is drawn so that the original equilibrium occurs at point E_0, at which point the economy is producing at its potential GDP.
The Rebound to Potential GDP after AD Increases



The original equilibrium (E_0), at an output level of 500 and a price level of 120, happens at the intersection of the aggregate demand curve (AD_0) and the short-run aggregate supply curve ($SRAS_0$). The output at E_0 is equal to potential GDP. Aggregate demand shifts right from AD_0 to AD_1. The new equilibrium is E_1, with a higher output level of 550 and an increase in the price level to 125. With unemployment rates unsustainably low, wages are bid up by eager employers, which shifts short-run aggregate supply to the left, from $SRAS_0$ to $SRAS_1$. The new equilibrium (E_2) is at the same original level of output, 500, but at a higher price level of 130. Thus, the long-run aggregate supply curve (LRASn), which is vertical at the level of potential GDP, determines the level of real GDP in this economy in the long run.

Now, imagine that some economic event boosts aggregate demand: perhaps a surge of export sales or a rise in business confidence that leads to more investment, perhaps a policy decision like higher government spending, or perhaps a tax cut that leads to additional aggregate demand. The short-run Keynesian analysis is that the rise in aggregate demand will shift the aggregate demand curve out to the right, from AD_0 to AD_1, leading to a new equilibrium at point E_1 with higher output, lower unemployment, and pressure for an inflationary rise in the price level.

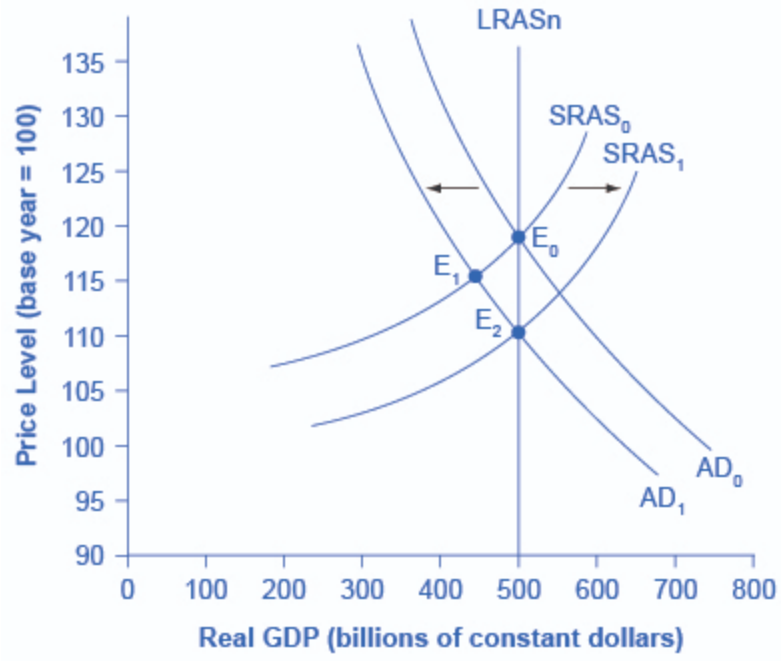
In the long-run neoclassical analysis, however, the chain of economic events is just beginning. As economic output rises above potential GDP, the level of unemployment falls. The economy is now above full employment and there is a shortage of labor. Eager employers are trying to bid workers away from other companies and to encourage their current workers to exert more effort and to put in longer hours. This high demand for labor will drive up wages. Most workers have their salaries reviewed only once or twice a year, and so it will take time before the higher wages filter through the economy. As wages do rise, it will mean a leftward shift in the short-run Keynesian aggregate supply curve back to $SRAS_1$, because the price of a major input to production has increased. The economy moves to a new equilibrium (E_2). The new equilibrium has the same level of real GDP as did the original equilibrium (E_0), but there has been an inflationary increase in the price level.

This description of the short-run shift from E_0 to E_1 and the long-run shift from E_1 to E_2 is a step-by-step way of making a simple point: the economy cannot sustain production above its potential GDP in the long run. An economy may produce above its level of potential GDP in the short run, under pressure from a surge in aggregate demand. Over the long run, however, that surge in aggregate demand ends up as an increase in the price level, not as a rise in output.

The rebound of the economy back to potential GDP also works in response to a shift to the left in aggregate demand. [link] again starts with two aggregate supply curves, with $SRAS_0$ showing the original upward sloping

short-run Keynesian AS curve and LRASn showing the vertical long-run neoclassical aggregate supply curve. A decrease in aggregate demand—for example, because of a decline in consumer confidence that leads to less consumption and more saving—causes the original aggregate demand curve AD_0 to shift back to AD_1. The shift from the original equilibrium (E_0) to the new equilibrium (E_1) results in a decline in output. The economy is now below full employment and there is a surplus of labor. As output falls below potential GDP, unemployment rises. While a lower price level (i.e., deflation) is rare in the United States, it does happen from time to time during very weak periods of economic activity. For practical purposes, we might consider a lower price level in the AD–AS model as indicative of disinflation, which is a decline in the rate of inflation. Thus, the long-run aggregate supply curve LRASn, which is vertical at the level of potential GDP, ultimately determines the real GDP of this economy.

A Rebound Back to Potential GDP from a Shift to the Left in Aggregate Demand



The original equilibrium (E_0), at an output level of 500 and a price level of 120, happens at the intersection of the aggregate demand curve (AD_0) and the short-run aggregate supply curve ($SRAS_0$). The output at E_0 is equal to potential GDP.

Aggregate demand shifts left, from AD_0 to AD_1. The new equilibrium is at E_1, with a lower output level of 450 and downward pressure on the price level of 115. With high unemployment rates, wages are held down. Lower wages are an economy-wide decrease in the price of a key input, which shifts short-run aggregate supply to the right, from $SRAS_0$ to $SRAS_1$. The new equilibrium (E_2) is at the same original level of output, 500, but at a lower price level of 110.

Again, from the neoclassical perspective, this short-run scenario is only the beginning of the chain of events. The higher level of unemployment means more workers looking for jobs. As a result, employers can hold down on pay increases—or perhaps even replace some of their higher-paid workers with unemployed people willing to accept a lower wage. As wages stagnate or fall, this decline in the price of a key input means that the short-run Keynesian aggregate supply curve shifts to the right from its original ($SRAS_0$ to $SRAS_1$). The overall impact in the long run, as the macroeconomic equilibrium shifts from E_0 to E_1 to E_2, is that the level of output returns to potential GDP, where it started. There is, however, downward pressure on the price level. Thus, in the neoclassical view, changes in aggregate demand can have a short-run impact on output and on unemployment—but only a short-run impact. In the long run, when wages and prices are flexible, potential GDP and aggregate supply determine the size of real GDP.

How Fast Is the Speed of Macroeconomic Adjustment?

How long does it take for wages and prices to adjust, and for the economy to rebound back to its potential GDP? This subject is highly contentious. Keynesian economists argue that if the adjustment from recession to potential GDP takes a very long time, then neoclassical theory may be more

hypothetical than practical. In response to those immortal words of John Maynard Keynes, “In the long run we are all dead,” neoclassical economists respond that even if the adjustment takes as long as, say, ten years the neoclassical perspective remains of central importance in understanding the economy.

One subset of neoclassical economists holds that the adjustment of wages and prices in the macroeconomy might be quite rapid indeed. The theory of **rational expectations** holds that people form the most accurate possible expectations about the future that they can, using all information available to them. In an economy where most people have rational expectations, economic adjustments may happen very quickly.

To understand how rational expectations may affect the speed of price adjustments, think about a situation in the real estate market. Imagine that several events seem likely to push up the value of homes in the neighborhood. Perhaps a local employer announces that it is going to hire many more people or the city announces that it is going to build a local park or a library in that neighborhood. The theory of rational expectations points out that even though none of the changes will happen immediately, home prices in the neighborhood will rise immediately, because the expectation that homes will be worth more in the future will lead buyers to be willing to pay more in the present. The amount of the immediate increase in home prices will depend on how likely it seems that the announcements about the future will actually happen and on how distant the local jobs and neighborhood improvements are in the future. The key point is that, because of rational expectations, prices do not wait on events, but adjust immediately.

At a macroeconomic level, the theory of rational expectations points out that if the aggregate supply curve is vertical over time, then people should rationally expect this pattern. When a shift in aggregate demand occurs, people and businesses with rational expectations will know that its impact on output and employment will be temporary, while its impact on the price level will be permanent. If firms and workers perceive the outcome of the process in advance, and if all firms and workers know that everyone else is perceiving the process in the same way, then they have no incentive to go

through an extended series of short-run scenarios, like a firm first hiring more people when aggregate demand shifts out and then firing those same people when aggregate supply shifts back. Instead, everyone will recognize where this process is heading—toward a change in the price level—and then will act on that expectation. In this scenario, the expected long-run change in the price level may happen very quickly, without a drawn-out zigzag of output and employment first moving one way and then the other.

The theory that people and firms have rational expectations can be a useful simplification, but as a statement about how people and businesses actually behave, the assumption seems too strong. After all, many people and firms are not especially well informed, either about what is happening in the economy or about how the economy works. An alternate assumption is that people and firms act with **adaptive expectations**: they look at past experience and gradually adapt their beliefs and behavior as circumstances change, but are not perfect synthesizers of information and accurate predictors of the future in the sense of rational expectations theory. If most people and businesses have some form of adaptive expectations, then the adjustment from the short run and long run will be traced out in incremental steps that occur over time.

The empirical evidence on the speed of macroeconomic adjustment of prices and wages is not clear-cut. Indeed, the speed of macroeconomic adjustment probably varies among different countries and time periods. A reasonable guess is that the initial short-run effect of a shift in aggregate demand might last two to five years, before the adjustments in wages and prices cause the economy to adjust back to potential GDP. Thus, one might think of the short run for applying Keynesian analysis as time periods less than two to five years, and the long run for applying neoclassical analysis as longer than five years. For practical purposes, this guideline is frustratingly imprecise, but when analyzing a complex social mechanism like an economy as it evolves over time, some imprecision seems unavoidable.

Key Concepts and Summary

Neoclassical perspective argues that, in the long run, the economy will adjust back to its potential GDP level of output through flexible price

levels. Thus, the neoclassical perspective views the long-run AS curve as vertical. A rational expectations perspective argues that people have excellent information about economic events and how the economy works and that, as a result, price and other economic adjustments will happen very quickly. In adaptive expectations theory, people have limited information about economic information and how the economy works, and so price and other economic adjustments can be slow.

Self-Check Question

Exercise:

Problem:

Do rational expectations tend to look back at past experience while adaptive expectations look ahead to the future? Explain your answer.

Solution:

No, this statement is false. It would be more accurate to say that rational expectations seek to predict the future as accurately as possible, using all of past experience as a guide. Adaptive expectations are largely backward looking; that is, they adapt as experience accumulates, but without attempting to look forward.

Review Questions

Exercise:

Problem:

Does neoclassical economics focus on the long term or the short term? Explain your answer.

Exercise:

Problem:

Does neoclassical economics view prices and wages as sticky or flexible? Why?

Exercise:

Problem:

What shape is the long-run aggregate supply curve? Why does it have this shape?

Exercise:

Problem:

What is the difference between rational expectations and adaptive expectations?

Exercise:

Problem:

A neoclassical economist and a Keynesian economist are studying the economy of Vineland. It appears that Vineland is beginning to experience a mild recession with a decrease in aggregate demand. Which of these two economists would likely advocate that the government of Vineland take active measures to reverse this decline in aggregate demand? Why?

Critical Thinking Questions

Exercise:

Problem:

If most people have rational expectations, how long will recessions last?

Exercise:

Problem:

Explain why the neoclassical economists believe that nothing much needs to be done about unemployment. Do you agree or disagree? Explain.

Problems

Exercise:

Problem: Use [link] to answer the following questions.

Price Level	Aggregate Supply	Aggregate Demand
90	3,000	3,500
95	3,000	3,000
100	3,000	2,500
105	3,000	2,200
110	3,000	2,100

a. Sketch an aggregate supply and aggregate demand diagram.
b. What is the equilibrium output and price level?
c. If aggregate demand shifts right, what is equilibrium output?
d. If aggregate demand shifts left, what is equilibrium output?
e. In this scenario, would you suggest using aggregate demand to alter the level of output or to control any inflationary increases in

the price level?

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Glossary

adaptive expectations
: the theory that people look at past experience and gradually adapt their beliefs and behavior as circumstances change

neoclassical perspective
: the philosophy that, in the long run, the business cycle will fluctuate around the potential, or full-employment, level of output

physical capital per person
: the amount and kind of machinery and equipment available to help a person produce a good or service

rational expectations
: the theory that people form the most accurate possible expectations about the future that they can, using all information available to them

The Policy Implications of the Neoclassical Perspective

By the end of this section, you will be able to:

- Discuss why and how inflation expectations are measured
- Analyze the impacts of fiscal policy and monetary policy on aggregate supply and aggregate demand
- Explain the neoclassical Phillips curve, noting its tradeoff between inflation and unemployment
- Identify clear distinctions between neoclassical economics and Keynesian economics

To understand the policy recommendations of the neoclassical economists, it helps to start with the Keynesian perspective. Suppose a decrease in aggregate demand causes the economy to go into recession with high unemployment. The Keynesian response would be to use government policy to stimulate aggregate demand and eliminate the recessionary gap. The neoclassical economists believe that the Keynesian response, while perhaps well intentioned, will not have a good outcome for reasons we will discuss shortly. Since the neoclassical economists believe that the economy will correct itself over time, the only advantage of a Keynesian stabilization policy would be to speed up the process and minimize the time that the unemployed are out of work. Is that the likely outcome?

Keynesian macroeconomic policy requires some optimism about the ability of the government to recognize a situation of too little or too much aggregate demand, and to adjust aggregate demand accordingly with the right level of changes in taxes or spending, all enacted in a timely fashion. After all, neoclassical economists argue, it takes government statisticians months to produce even preliminary estimates of GDP so that politicians know whether a recession is occurring—and those preliminary estimates may be revised substantially later. Moreover, there is the question of timely action. The political process can take more months to enact a tax cut or a spending increase; the amount of those tax or spending changes may be determined as much by political considerations as economic ones; and then the economy will take still more months to put changes in aggregate demand into effect through spending and production. When all of these time lags and political realities are considered, active fiscal policy may fail to

address the current problem, and could even make the future economy worse. The average U.S. post-World War II recession has lasted only about a year. By the time government policy kicks in, the recession will likely be over. As a consequence, the only result of government fine-tuning will be to stimulate the economy when it is already recovering (or to contract the economy when it is already falling). In other words, an active macroeconomic policy is likely to exacerbate the cycles rather than dampen them. Indeed, some neoclassical economists believe a large part of the business cycles we observe are due to flawed government policy. To learn about this issue further, read the following Clear It Up feature.

Note:

Why and how are inflation expectations measured?

People take expectations about inflation into consideration every time they make a major purchase, such as a house or a car. As inflation fluctuates, so too does the nominal interest rate on loans to buy these goods. The nominal interest rate is comprised of the real rate, plus an **expected inflation** factor. Expected inflation also tells economists about how the public views the direction of the economy. Suppose the public expects inflation to increase. This could be the result of positive demand shock due to an expanding economy and increasing aggregate demand. It could also be the result of a negative supply shock, perhaps from rising energy prices, and decreasing aggregate supply. In either case, the public may expect the central bank to engage in contractionary monetary policy to reduce inflation, and this policy results in higher interest rates. If, on the other hand, inflation is expected to decrease, the public may anticipate a recession. In turn, the public may expect expansionary monetary policy, and the lowering of interest rates, in the short run. By monitoring expected inflation, economists garner information about the effectiveness of macroeconomic policies. Additionally, monitoring expected inflation allows for projecting the direction of real interest rates that isolate for the effect of inflation. This information is necessary for making decisions about financing investments. Expectations about inflation may seem like a highly theoretical concept, but, in fact, inflation expectations are measured by the Federal Reserve Bank based upon early research conducted by Joseph Livingston, a

financial journalist for the *Philadelphia Inquirer*. In 1946, he started a twice-a-year survey of economists about their expectations of inflation. After Livingston's death in 1969, the survey was continued by the Federal Reserve Bank and other economic research agencies such as the Survey Research Center at the University of Michigan, the American Statistical Association, and the National Bureau of Economic Research.
Current research by the Federal Reserve compares these expectations to actual inflation that has occurred, and the results, so far, are mixed. Economists' forecasts, however, have become notably more accurate in the last few decades. Economists are actively researching how expectations of inflation and other economic variables are formed and changed.

Note:
Visit this website to read "The Federal Reserve Bank of Cleveland's Economic Commentary: A New Approach to Gauging Inflation Expectations" by Joseph G. Haubrich for more information about how expected inflation is forecast.

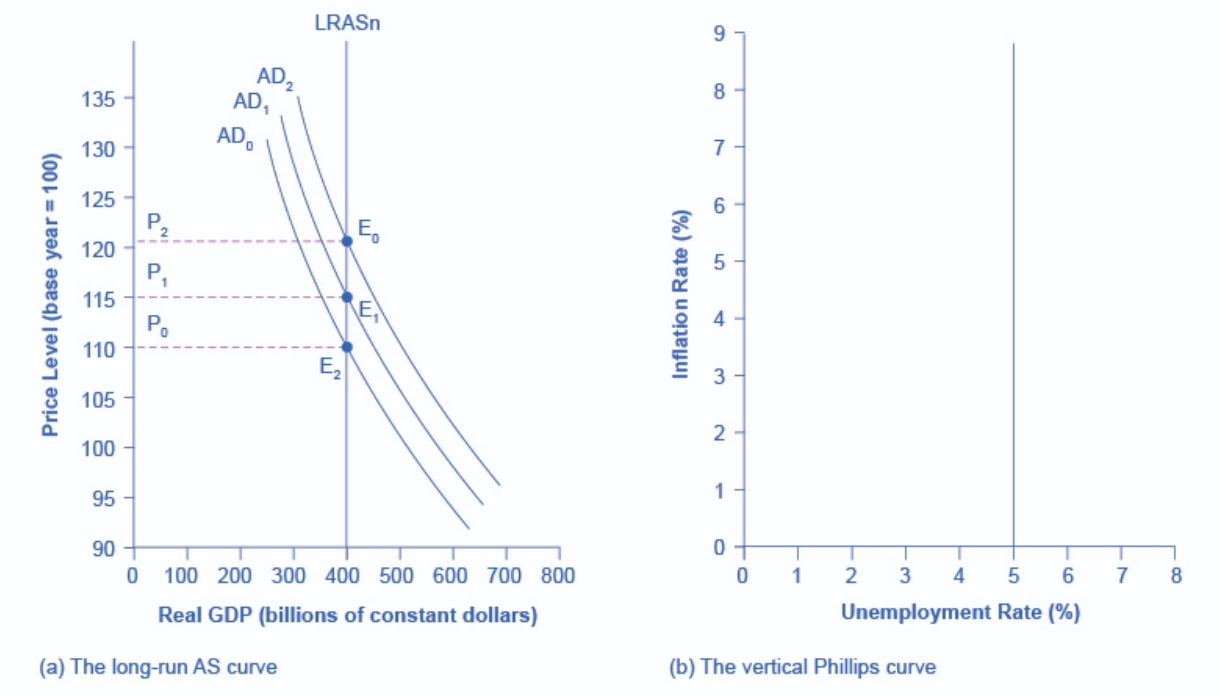


The Neoclassical Phillips Curve Tradeoff

The Keynesian Perspective introduced the Phillips curve and explained how it is derived from the aggregate supply curve. The short run upward sloping aggregate supply curve implies a downward sloping Phillips curve; thus, there is a tradeoff between inflation and unemployment in the short run. By contrast, a neoclassical long-run aggregate supply curve will imply a vertical shape for the Phillips curve, indicating no long run tradeoff between

inflation and unemployment. [link] (a) shows the vertical AS curve, with three different levels of aggregate demand, resulting in three different equilibria, at three different price levels. At every point along that vertical AS curve, potential GDP and the rate of unemployment remains the same. Assume that for this economy, the natural rate of unemployment is 5%. As a result, the long-run Phillips curve relationship, shown in [link] (b), is a vertical line, rising up from 5% unemployment, at any level of inflation. Read the following Work It Out feature for additional information on how to interpret inflation and unemployment rates.

From a Long-Run AS Curve to a Long-Run Phillips Curve



(a) With a vertical LRAS curve, shifts in aggregate demand do not alter the level of output but do lead to changes in the price level. Because output is unchanged between the equilibria E_0, E_1, and E_2, all unemployment in this economy will be due to the natural rate of unemployment. (b) If the natural rate of unemployment is 5%, then the Phillips curve will be vertical. That is, regardless of changes in the price level, the unemployment rate remains at 5%.

Note:
Tracking Inflation and Unemployment Rates
Suppose that you have collected data for years on the rates of inflation and unemployment and recorded them in a table, such as [link]. How do you interpret that information?

Year	Inflation Rate	Unemployment Rate
1970	2%	4%
1975	3%	3%
1980	2%	4%
1985	1%	6%
1990	1%	4%
1995	4%	2%
2000	5%	4%

Step 1. Plot the data points in a graph with inflation rate on the vertical axis and unemployment rate on the horizontal axis. Your graph will appear similar to [link].
Inflation Rates



Step 2. What patterns do you see in the data? You should notice that there are years when unemployment falls but inflation rises, and other years where unemployment rises and inflation falls.

Step 3. Can you determine the natural rate of unemployment from the data or from the graph? As you analyze the graph, it appears that the natural rate of unemployment lies at 4%; this is the rate that the economy appears to adjust back to after an apparent change in the economy. For example, in 1975 the economy appeared to have an increase in aggregate demand; the unemployment rate fell to 3% but inflation increased from 2% to 3%. By 1980, the economy had adjusted back to 4% unemployment and the inflation rate had returned to 2%. In 1985, the economy looks to have suffered a recession as unemployment rose to 6% and inflation fell to 1%. This would be consistent with a decrease in aggregate demand. By 1990, the economy recovered back to 4% unemployment, but at a lower inflation rate of 1%. In 1995 the economy again rebounded and unemployment fell to 2%, but inflation increased to 4%, which is consistent with a large increase in aggregate demand. The economy adjusted back to 4% unemployment but at a higher rate of inflation of 5%. Then in 2000, both unemployment and inflation increased to 5% and 4%, respectively.

Step 4. Do you see the Phillips curve(s) in the data? If we trace the downward sloping trend of data points, we could see a short-run Phillips curve that exhibits the inverse tradeoff between higher unemployment and lower inflation rates. If we trace the vertical line of data points, we could see a long-run Phillips curve at the 4% natural rate of unemployment.

The unemployment rate on the long-run Phillips curve will be the natural rate of unemployment. A small inflationary increase in the price level from AD_0 to AD_1 will have the same natural rate of unemployment as a larger inflationary increase in the price level from AD_0 to AD_2. The macroeconomic equilibrium along the vertical aggregate supply curve can occur at a variety of different price levels, and the natural rate of unemployment can be consistent with all different rates of inflation. The great economist Milton Friedman (1912–2006) summed up the neoclassical view of the long-term Phillips curve tradeoff in a 1967 speech: "[T]here is always a temporary trade-off between inflation and unemployment; there is no permanent trade-off."

In the Keynesian perspective, the primary focus is on getting the level of aggregate demand right in relationship to an upward-sloping aggregate supply curve. That is, AD should be adjusted so that the economy produces at its potential GDP, not so low that cyclical unemployment results and not so high that inflation results. In the neoclassical perspective, aggregate supply will determine output at potential GDP, unemployment is determined by the natural rate of unemployment churned out by the forces of supply and demand in the labor market, and shifts in aggregate demand are the primary determinant of changes in the price level.

Note:
Visit this website to read about the effects of economic intervention.



Fighting Unemployment or Inflation?

As explained in Unemployment, unemployment can be divided into two categories: cyclical unemployment and the natural rate of unemployment, which is the sum of frictional and structural unemployment. Cyclical unemployment results from fluctuations in the business cycle and is created when the economy is producing below potential GDP—giving potential employers less incentive to hire. When the economy is producing at potential GDP, cyclical unemployment will be zero. Because of the dynamics of the labor market, in which people are always entering or exiting the labor force, the unemployment rate never falls to 0%, not even when the economy is producing at or even slightly above potential GDP. Probably the best we can hope for is for the number of job vacancies to equal the number of job seekers. We know that it takes time for job seekers and employers to find each other, and this time is the cause of frictional unemployment. Most economists do not consider frictional unemployment to be a "bad" thing. After all, there will always be workers who are unemployed while looking for a job that is a better match for their skills. There will always be employers that have an open position, while looking for a worker that is a better match for the job. Ideally, these matches happen quickly, but even when the economy is very strong there will be some natural unemployment and this is what is measured by the natural rate of unemployment.

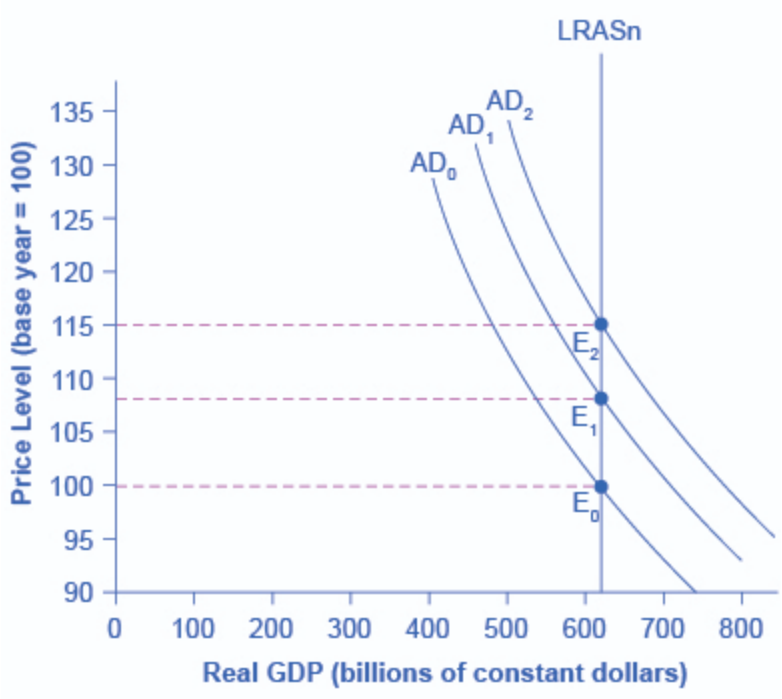
The neoclassical view of unemployment tends to focus attention away from the problem of cyclical unemployment—that is, unemployment caused by recession—while putting more attention on the issue of the rates of unemployment that prevail even when the economy is operating at potential GDP. To put it another way, the neoclassical view of unemployment tends to focus on how public policy can be adjusted to reduce the natural rate of unemployment. Such policy changes might involve redesigning unemployment and welfare programs so that they support those in need, but also offer greater encouragement for job-hunting. It might involve redesigning business rules with an eye to whether they are unintentionally discouraging businesses from taking on new employees. It might involve building institutions to improve the flow of information about jobs and the mobility of workers, to help bring workers and employers together more quickly. For those workers who find that their skills are permanently no longer in demand (for example, the structurally unemployed), policy can be

designed to provide opportunities for retraining so that these workers can reenter the labor force and seek employment.

Neoclassical economists will not tend to see aggregate demand as a useful tool for reducing unemployment; after all, if economic output is determined by a vertical aggregate supply curve, then aggregate demand has no long-run effect on unemployment. Instead, neoclassical economists believe that aggregate demand should be allowed to expand only to match the gradual shifts of aggregate supply to the right—keeping the price level much the same and inflationary pressures low.

If aggregate demand rises rapidly in the neoclassical model, in the long run it leads only to inflationary pressures. [link] shows a vertical LRAS curve and three different levels of aggregate demand, rising from AD_0 to AD_1 to AD_2. As the macroeconomic equilibrium rises from E_0 to E_1 to E_2, the price level rises, but real GDP does not budge; nor does the rate of unemployment, which adjusts to its natural rate. Conversely, reducing inflation has no long-term costs, either. Think about [link] in reverse, as the aggregate demand curve shifts from AD_2 to AD_1 to AD_0, and the equilibrium moves from E_2 to E_1 to E_0. During this process, the price level falls, but, in the long run, neither real GDP nor the natural rate of unemployment is changed.

How Aggregate Demand Determines the Price Level in the Long Run



As aggregate demand shifts to the right, from AD_0 to AD_1 to AD_2, real GDP in this economy and the level of unemployment do not change. However, there is inflationary pressure for a higher price level as the equilibrium changes from E_0 to E_1 to E_2.

Note:
Visit this website to read about how inflation and unemployment are related.



Fighting Recession or Encouraging Long-Term Growth?

Neoclassical economists believe that the economy will rebound out of a recession or eventually contract during an expansion because prices and wage rates are flexible and will adjust either upward or downward to restore the economy to its potential GDP. Thus, the key policy question for neoclassicals is how to promote growth of potential GDP. We know that economic growth ultimately depends on the growth rate of long-term productivity. Productivity measures how effective inputs are at producing outputs. We know that U.S. productivity has grown on average about 2% per year. That means that the same amount of inputs produce 2% more output than the year before. We also know that productivity growth varies a great deal in the short term due to cyclical factors. It also varies somewhat in the long term. From 1953–1972, U.S. labor productivity (as measured by output per hour in the business sector) grew at 3.2% per year. From 1973–1992, productivity growth declined significantly to 1.8% per year. Then, from 1993–2014, productivity growth increased slightly to 2% per year. The neoclassical economists believe the underpinnings of long-run productivity growth to be an economy's investments in human capital, physical capital, and technology, operating together in a market-oriented environment that rewards innovation. Promotion of these factors is what government policy should focus on.

Summary of Neoclassical Macroeconomic Policy Recommendations

Let’s summarize what neoclassical economists recommend for macroeconomic policy. Neoclassical economists do not believe in “fine-tuning” the economy. They believe that economic growth is fostered by a stable economic environment with a low rate of inflation. Similarly, tax rates should be low and unchanging. In this environment, private economic agents can make the best possible investment decisions, which will lead to optimal investment in physical and human capital as well as research and development to promote improvements in technology.

Summary of Neoclassical Economics versus Keynesian Economics

[link] summarizes the key differences between the two schools of thought.

Summary	Neoclassical Economics	Keynesian Economics
Focus: long-term or short term	Long-term	Short-term
Prices and wages: sticky or flexible?	Flexible	Sticky
Economic output: Primarily determined by aggregate demand or aggregate supply?	Aggregate supply	Aggregate demand
Aggregate supply: vertical or upward-sloping?	Vertical	Upward-sloping

Summary	Neoclassical Economics	Keynesian Economics
Phillips curve vertical or downward-sloping	Vertical	Downward sloping
Is aggregate demand a useful tool for controlling inflation?	Yes	Yes
What should be the primary area of policy emphasis for reducing unemployment?	Reform labor market institutions to reduce natural rate of unemployment	Increase aggregate demand to eliminate cyclical unemployment
Is aggregate demand a useful tool for ending recession?	At best, only in the short-run temporary sense, but may just increase inflation instead	Yes

Neoclassical versus Keynesian Economics

Key Concepts and Summary

Neoclassical economists tend to put relatively more emphasis on long-term growth than on fighting recession, because they believe that recessions will fade in a few years and long-term growth will ultimately determine the standard of living. They tend to focus more on reducing the natural rate of unemployment caused by economic institutions and government policies than the cyclical unemployment caused by recession.

Neoclassical economists also see no social benefit to inflation. With an upward-sloping Keynesian AS curve, inflation can arise because an economy is approaching full employment. With a vertical long-run neoclassical AS curve, inflation does not accompany any rise in output. If aggregate supply is vertical, then aggregate demand does not affect the quantity of output. Instead, aggregate demand can only cause inflationary changes in the price level. A vertical aggregate supply curve, where the quantity of output is consistent with many different price levels, also implies a vertical Phillips curve.

Self-Check Questions

Exercise:

Problem:

Legislation proposes that the government should use macroeconomic policy to achieve an unemployment rate of zero percent, by increasing aggregate demand for as much and as long as necessary to accomplish this goal. From a neoclassical perspective, how will this policy affect output and the price level in the short run and in the long run? Sketch an aggregate demand/aggregate supply diagram to illustrate your answer. *Hint*: revisit [link].

Solution:

An unemployment rate of zero percent is presumably well below the rate that is consistent with potential GDP and with the natural rate of unemployment. As a result, this policy would be attempting to push AD out to the right.

In the short run, it is possible to have unemployment slightly below the natural rate for a time, at a price of higher inflation, as shown by the movement from E_0 to E_1 along the short-run AS curve. However, over time the extremely low unemployment rates will tend to cause wages to be bid up, and shift the short-run AS curve back to the left. The result would be a higher price level, but an economy still at potential GDP and the natural rate of unemployment, as determined by the long-

run AS curve. If the government continues this policy, it will continually be pushing the price level higher and higher, but it will not be able to achieve its goal of zero percent unemployment, because that goal is inconsistent with market forces.

Exercise:

Problem:

Would it make sense to argue that rational expectations economics is an extreme version of neoclassical economics? Explain.

Solution:

The statement is accurate. Rational expectations can be thought of as a version of neoclassical economics because it argues that potential GDP and the rate of unemployment are shaped by market forces as wages and prices adjust. However, it is an "extreme" version because it argues that this adjustment takes place very quickly. Other theories, like adaptive expectations, suggest that adjustment to the neoclassical outcome takes a few years.

Review Questions

Exercise:

Problem:

Do neoclassical economists tend to focus more on long term economic growth or on recessions? Explain briefly.

Exercise:

Problem:

Do neoclassical economists tend to focus more on cyclical unemployment or on inflation? Explain briefly.

Exercise:

Problem:

Do neoclassical economists see a value in tolerating a little more inflation if it brings additional economic output? Explain your answer.

Exercise:

Problem:

If aggregate supply is vertical, what role does aggregate demand play in determining output? In determining the price level?

Exercise:

Problem:

What is the shape of the neoclassical long-run Phillips curve? What assumptions are made that lead to this shape?

Critical Thinking Question

Exercise:

Problem:

The American Recovery and Reinvestment Act was criticized by economists from all theoretical persuasions. The “Stimulus Package” was arguably a Keynesian measure so why would a Keynesian economist be critical of it? Why would neoclassical economists be critical?

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Glossary

expected inflation
: a future rate of inflation that consumers and firms build into current decision making

Introduction to Monetary Policy and Bank Regulation
class="introduction"
Marriner S. Eccles Federal Reserve Headquarters, Washington D.C.

Some of the most influential decisions regarding monetary policy in the United States are made behind these doors. (Credit: modification of work by “squirrel83”/Flickr Creative Commons)



Note:

The Problem of the Zero Percent Interest Rate Lower Bound

Most economists believe that monetary policy (the manipulation of interest rates and credit conditions by a nation's central bank) has a powerful influence on a nation's economy. Monetary policy works when the central bank reduces interest rates and makes credit more available. As a result, business investment and other types of spending increase, causing GDP and employment to grow.

But what if the interest rates banks pay are close to zero already? They cannot be made negative, can they? That would mean that lenders pay borrowers for the privilege of taking their money. Yet, this was the situation the U.S. Federal Reserve found itself in at the end of the 2008–2009 recession. The federal funds rate, which is the interest rate for banks that the Federal Reserve targets with its monetary policy, was slightly above 5% in 2007. By 2009, it had fallen to 0.16%.

The Federal Reserve's situation was further complicated because fiscal policy, the other major tool for managing the economy, was constrained by fears that the federal budget deficit and the public debt were already too high. What were the Federal Reserve's options? How could monetary policy be used to stimulate the economy? The answer, as we will see in this chapter, was to change the rules of the game.

Note:

Introduction to Monetary Policy and Bank Regulation

In this chapter, you will learn about:

- The Federal Reserve Banking System and Central Banks
- Bank Regulation
- How a Central Bank Executes Monetary Policy
- Monetary Policy and Economic Outcomes
- Pitfalls for Monetary Policy

Money, loans, and banks are all tied together. Money is deposited in bank accounts, which is then loaned to businesses, individuals, and other banks. When the interlocking system of money, loans, and banks works well, economic transactions are made smoothly in goods and labor markets and savers are connected with borrowers. If the money and banking system does not operate smoothly, the economy can either fall into recession or suffer prolonged inflation.

The government of every country has public policies that support the system of money, loans, and banking. But these policies do not always work perfectly. This chapter discusses how monetary policy works and what may prevent it from working perfectly.

The Federal Reserve Banking System and Central Banks

By the end of this section, you will be able to:

- Explain the structure and organization of the U.S. Federal Reserve
- Discuss how central banks impact monetary policy, promote financial stability, and provide banking services

In making decisions about the money supply, a central bank decides whether to raise or lower interest rates and, in this way, to influence macroeconomic policy, whose goal is low unemployment and low inflation. The central bank is also responsible for regulating all or part of the nation's banking system to protect bank depositors and insure the health of the bank's balance sheet.

The organization responsible for conducting monetary policy and ensuring that a nation's financial system operates smoothly is called the **central bank**. Most nations have central banks or currency boards. Some prominent central banks around the world include the European Central Bank, the Bank of Japan, and the Bank of England. In the United States, the central bank is called the Federal Reserve—often abbreviated as just "the Fed." This section explains the organization of the U.S. Federal Reserve and identifies the major responsibilities of a central bank.

Structure/Organization of the Federal Reserve

Unlike most central banks, the Federal Reserve is semi-decentralized, mixing government appointees with representation from private-sector banks. At the national level, it is run by a Board of Governors, consisting of seven members appointed by the President of the United States and confirmed by the Senate. Appointments are for 14-year terms and they are arranged so that one term expires January 31 of every even-numbered year. The purpose of the long and staggered terms is to insulate the Board of Governors as much as possible from political pressure so that policy decisions can be made based only on their economic merits. Additionally, except when filling an unfinished term, each member only serves one term, further insulating decision-making from politics. Policy decisions of the

Fed do not require congressional approval, and the President cannot ask for the resignation of a Federal Reserve Governor as the President can with cabinet positions.

One member of the Board of Governors is designated as the Chair. For example, from 1987 until early 2006, the Chair was Alan Greenspan. From 2006 until 2014, Ben Bernanke held the post. The current Chair, Janet Yellen, has made many headlines already. Why? See the following Clear It Up feature to find out.

Note:
Who has the most immediate economic power in the world?
Chair of the Federal Reserve Board



Janet L. Yellen is the first woman to hold the position of Chair of the Federal Reserve Board of Governors. (Credit: Board of Governors of the Federal Reserve System)

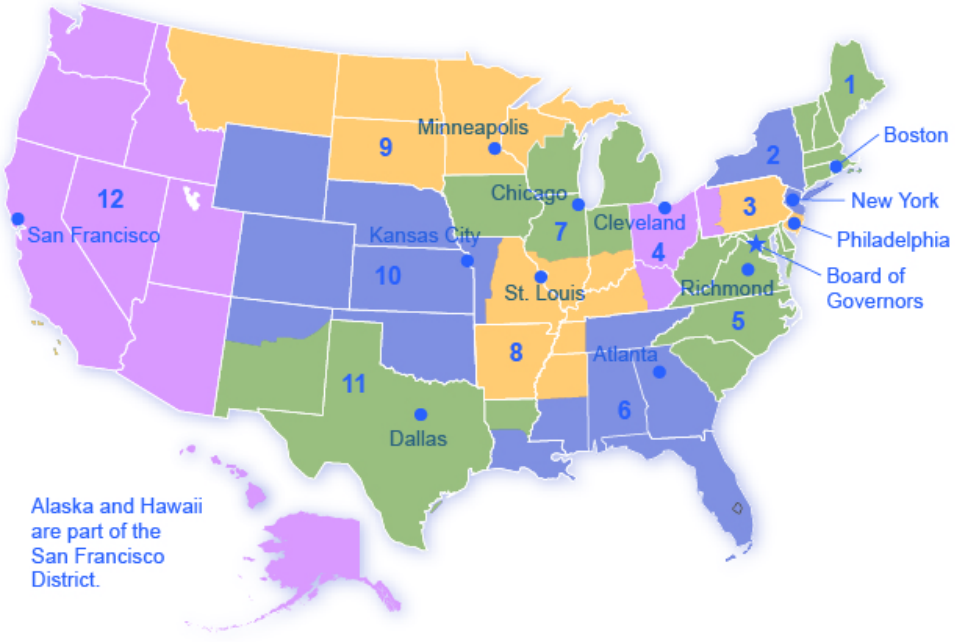
What individual can make financial market crash or soar just by making a public statement? It is not Bill Gates or Warren Buffett. It is not even the President of the United States. The answer is the Chair of the Federal Reserve Board of Governors. In early 2014, Janet L. Yellen, shown in [link] became the first woman to hold this post. Yellen has been described in the media as "perhaps the most qualified Fed chair in history." With a Ph.D. in economics from Yale University, Yellen has taught macroeconomics at Harvard, the London School of Economics, and most recently at the University of California at Berkeley. From 2004–2010, Yellen was President of the Federal Reserve Bank of San Francisco. Not an ivory tower economist, Yellen became one of the few economists who warned about a possible bubble in the housing market, more than two years before the financial crisis occurred. Yellen served on the Board of Governors of the Federal Reserve twice, most recently as Vice Chair. She also spent two years as Chair of the President's Council of Economic Advisors. If experience and credentials mean anything, Yellen is likely to be an effective Fed chair.

The Fed Chair is first among equals on the Board of Governors. While he or she has only one vote, the Chair controls the agenda, and is the public voice of the Fed, so he or she has more power and influence than one might expect.

Note:
Visit this website to see who the current members of the Federal Reserve Board of Governors are. You can follow the links provided for each board member to learn more about their backgrounds, experiences, and when their terms on the board will end.

The Federal Reserve is more than the Board of Governors. The Fed also includes 12 regional Federal Reserve banks, each of which is responsible for supporting the commercial banks and economy generally in its district. The Federal Reserve districts and the cities where their regional headquarters are located are shown in [link]. The commercial banks in each district elect a Board of Directors for each regional Federal Reserve bank, and that board chooses a president for each regional Federal Reserve district. Thus, the Federal Reserve System includes both federally and private-sector appointed leaders.

The Twelve Federal Reserve Districts



There are twelve regional Federal Reserve banks, each with its district.

What Does a Central Bank Do?

The Federal Reserve, like most central banks, is designed to perform three important functions:

1. To conduct monetary policy
2. To promote stability of the financial system
3. To provide banking services to commercial banks and other depository institutions, and to provide banking services to the federal government.

The first two functions are sufficiently important that we will discuss them in their own modules; the third function we will discuss here.

The Federal Reserve provides many of the same services to banks as banks provide to their customers. For example, all commercial banks have an account at the Fed where they deposit reserves. Similarly, banks can obtain loans from the Fed through the "discount window" facility, which will be discussed in more detail later. The Fed is also responsible for check processing. When you write a check, for example, to buy groceries, the grocery store deposits the check in its bank account. Then, the physical check (or an image of that actual check) is returned to your bank, after which funds are transferred from your bank account to the account of the grocery store. The Fed is responsible for each of these actions.

On a more mundane level, the Federal Reserve ensures that enough currency and coins are circulating through the financial system to meet public demands. For example, each year the Fed increases the amount of currency available in banks around the Christmas shopping season and reduces it again in January.

Finally, the Fed is responsible for assuring that banks are in compliance with a wide variety of consumer protection laws. For example, banks are forbidden from discriminating on the basis of age, race, sex, or marital status. Banks are also required to disclose publicly information about the loans they make for buying houses and how those loans are distributed geographically, as well as by sex and race of the loan applicants.

Key Concepts and Summary

The most prominent task of a central bank is to conduct monetary policy, which involves changes to interest rates and credit conditions, affecting the amount of borrowing and spending in an economy. Some prominent central banks around the world include the U.S. Federal Reserve, the European Central Bank, the Bank of Japan, and the Bank of England.

Self-Check Question

Exercise:

Problem:

Why is it important for the members of the Board of Governors of the Federal Reserve to have longer terms in office than elected officials, like the President?

Solution:

Longer terms insulate the Board from political forces. Since the presidency can potentially change every four years, the Federal Reserve's independence prevents drastic swings in monetary policy with every new administration and allows policy decisions to be made only on economic grounds.

Review Questions

Exercise:

Problem:

How is a central bank different from a typical commercial bank?

Exercise:

Problem:

List the three traditional tools that a central bank has for controlling the money supply.

Critical Thinking Questions

Exercise:

Problem:

Why do presidents typically reappoint Chairs of the Federal Reserve Board even when they were originally appointed by a president of a different political party?

Exercise:

Problem:

In what ways might monetary policy be superior to fiscal policy? In what ways might it be inferior?

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Glossary

central bank

institution which conducts a nation’s monetary policy and regulates its banking system

Bank Regulation

By the end of this section, you will be able to:

- Discuss the relationship between bank regulation and monetary policy
- Explain bank supervision
- Explain how deposit insurance and lender of last resort are two strategies to protect against bank runs

A safe and stable national financial system is a critical concern of the Federal Reserve. The goal is not only to protect individuals' savings, but to protect the integrity of the financial system itself. This esoteric task is usually behind the scenes, but came into view during the 2008–2009 financial crisis, when for a brief period of time, critical parts of the financial system failed and firms became unable to obtain financing for ordinary parts of their business. Imagine if suddenly you were unable to access the money in your bank accounts because your checks were not accepted for payment and your debit cards were declined. This gives an idea of what a failure of the payments/financial system is like.

Bank regulation is intended to maintain the solvency of banks by avoiding excessive risk. Regulation falls into a number of categories, including reserve requirements, capital requirements, and restrictions on the types of investments banks may make. In Money and Banking, we learned that banks are required to hold a minimum percentage of their deposits on hand as reserves. "On hand" is a bit of a misnomer because, while a portion of bank reserves are held as cash in the bank, the majority are held in the bank's account at the Federal Reserve, and their purpose is to cover desired withdrawals by depositors. Another part of bank regulation is restrictions on the types of investments banks are allowed to make. Banks are allowed to make loans to businesses, individuals, and other banks. They are allowed to purchase U.S. Treasury securities but, to protect depositors, they are not permitted to invest in the stock market or other assets that are perceived as too risky.

Bank capital is the difference between a bank's assets and its liabilities. In other words, it is a bank's net worth. A bank must have positive net worth; otherwise it is insolvent or bankrupt, meaning it would not have enough

assets to pay back its liabilities. Regulation requires that banks maintain a minimum net worth, usually expressed as a percent of their assets, to protect their depositors and other creditors.

Note:
Visit this website to read the brief article, “Stop Confusing Monetary Policy and Bank Regulation.”



Bank Supervision

Several government agencies monitor the balance sheets of banks to make sure they have positive net worth and are not taking too high a level of risk. Within the U.S. Department of the Treasury, the Office of the Comptroller of the Currency has a national staff of bank examiners who conduct on-site reviews of the 1,500 or so of the largest national banks. The bank examiners also review any foreign banks that have branches in the United States. The Office of the Comptroller of the Currency also monitors and regulates about 800 savings and loan institutions.

The National Credit Union Administration (NCUA) supervises credit unions, which are nonprofit banks owned and run by their members. There are over 6,000 credit unions in the U.S. economy, though the typical credit union is small compared to most banks.

The Federal Reserve also has some responsibility for supervising financial institutions. For example, conglomerate firms that own banks and other

businesses are called “bank holding companies.” While other regulators like the Office of the Comptroller of the Currency supervises the banks, the Federal Reserve supervises the holding companies.

When the supervision of banks (and bank-like institutions such as savings and loans and credit unions) works well, most banks will remain financially healthy most of the time. If the bank supervisors find that a bank has low or negative net worth, or is making too high a proportion of risky loans, they can require that the bank change its behavior—or, in extreme cases, even force the bank to be closed or sold to a financially healthy bank.

Bank supervision can run into both practical and political questions. The practical question is that measuring the value of a bank’s assets is not always straightforward. As discussed in Money and Banking, a bank’s assets are its loans, and the value of these assets depends on estimates about the risk that these loans will not be repaid. These issues can become even more complex when a bank makes loans to banks or firms in other countries, or arranges financial deals that are much more complex than a basic loan.

The political question arises because the decision by a bank supervisor to require a bank to close or to change its financial investments is often controversial, and the bank supervisor often comes under political pressure from the owners of the bank and the local politicians to keep quiet and back off.

For example, many observers have pointed out that Japan’s banks were in deep financial trouble through most of the 1990s; however, nothing substantial had been done about it by the early 2000s. A similar unwillingness to confront problems with struggling banks is visible across the rest of the world, in East Asia, Latin America, Eastern Europe, Russia, and elsewhere.

In the United States, laws were passed in the 1990s requiring that bank supervisors make their findings open and public, and that they act as soon as a problem is identified. However, as many U.S. banks were staggered by the recession of 2008–2009, critics of the bank regulators asked pointed

questions about why the regulators had not foreseen the financial shakiness of the banks earlier, before such large losses had a chance to accumulate.

Bank Runs

Back in the nineteenth century and during the first few decades of the twentieth century (around and during the Great Depression), putting your money in a bank could be nerve-wracking. Imagine that the net worth of your bank became negative, so that the bank's assets were not enough to cover its liabilities. In this situation, whoever withdrew their deposits first received all of their money, and those who did not rush to the bank quickly enough, lost their money. Depositors racing to the bank to withdraw their deposits, as shown in [link] is called a **bank run**. In the movie *It's a Wonderful Life*, the bank manager, played by Jimmy Stewart, faces a mob of worried bank depositors who want to withdraw their money, but manages to allay their fears by allowing some of them to withdraw a portion of their deposits—using the money from his own pocket that was supposed to pay for his honeymoon.

A Run on the Bank



Bank runs during the Great Depression only served to worsen the economic

situation. (Credit: National Archives and Records Administration)

The risk of bank runs created instability in the banking system. Even a rumor that a bank might experience negative net worth could trigger a bank run and, in a bank run, even healthy banks could be destroyed. Because a bank loans out most of the money it receives, and because it keeps only limited reserves on hand, a bank run of any size would quickly drain any of the bank's available cash. When the bank had no cash remaining, it only intensified the fears of remaining depositors that they could lose their money. Moreover, a bank run at one bank often triggered a chain reaction of runs on other banks. In the late nineteenth and early twentieth century, bank runs were typically not the original cause of a recession—but they could make a recession much worse.

Deposit Insurance

To protect against bank runs, Congress has put two strategies into place: **deposit insurance** and the lender of last resort. Deposit insurance is an insurance system that makes sure depositors in a bank do not lose their money, even if the bank goes bankrupt. About 70 countries around the world, including all of the major economies, have deposit insurance programs. In the United States, the Federal Deposit Insurance Corporation (FDIC) is responsible for deposit insurance. Banks pay an insurance premium to the FDIC. The insurance premium is based on the bank's level of deposits, and then adjusted according to the riskiness of a bank's financial situation. In 2009, for example, a fairly safe bank with a high net worth might have paid 10–20 cents in insurance premiums for every $100 in bank deposits, while a risky bank with very low net worth might have paid 50–60 cents for every $100 in bank deposits.

Bank examiners from the FDIC evaluate the balance sheets of banks, looking at the value of assets and liabilities, to determine the level of riskiness. The FDIC provides deposit insurance for about 6,509 banks (as of the end of 2014). Even if a bank fails, the government guarantees that depositors will receive up to $250,000 of their money in each account,

which is enough for almost all individuals, although not sufficient for many businesses. Since the United States enacted deposit insurance in the 1930s, no one has lost any of their insured deposits. Bank runs no longer happen at insured banks.

Lender of Last Resort

The problem with bank runs is not that insolvent banks will fail; they are, after all, bankrupt and need to be shut down. The problem is that bank runs can cause solvent banks to fail and spread to the rest of the financial system. To prevent this, the Fed stands ready to lend to banks and other financial institutions when they cannot obtain funds from anywhere else. This is known as the **lender of last resort** role. For banks, the central bank acting as a lender of last resort helps to reinforce the effect of deposit insurance and to reassure bank customers that they will not lose their money.

The lender of last resort task can come up in other financial crises, as well. During the panic of the stock market crash in 1987, when the value of U.S. stocks fell by 25% in a single day, the Federal Reserve made a number of short-term emergency loans so that the financial system could keep functioning. During the recession of 2008–2009, the “quantitative easing” policies (discussed below) of the Federal Reserve can be interpreted as a willingness to make short-term credit available as needed in a time when the banking and financial system was under stress.

Key Concepts and Summary

A bank run occurs when there are rumors (possibly true, possibly false) that a bank is at financial risk of having negative net worth. As a result, depositors rush to the bank to withdraw their money and put it someplace safer. Even false rumors, if they cause a bank run, can force a healthy bank to lose its deposits and be forced to close. Deposit insurance guarantees bank depositors that, even if the bank has negative net worth, their deposits will be protected. In the United States, the Federal Deposit Insurance Corporation (FDIC) collects deposit insurance premiums from banks and guarantees bank deposits up to $250,000. Bank supervision involves inspecting the balance sheets of banks to make sure that they have positive

net worth and that their assets are not too risky. In the United States, the Office of the Comptroller of the Currency (OCC) is responsible for supervising banks and inspecting savings and loans and the National Credit Union Administration (NCUA) is responsible for inspecting credit unions. The FDIC and the Federal Reserve also play a role in bank supervision.

When a central bank acts as a lender of last resort, it makes short-term loans available in situations of severe financial panic or stress. The failure of a single bank can be treated like any other business failure. Yet if many banks fail, it can reduce aggregate demand in a way that can bring on or deepen a recession. The combination of deposit insurance, bank supervision, and lender of last resort policies help to prevent weaknesses in the banking system from causing recessions.

Self-Check Questions

Exercise:

Problem:

Given the danger of bank runs, why do banks not keep the majority of deposits on hand to meet the demands of depositors?

Solution:

Banks make their money from issuing loans and charging interest. The more money that is stored in the bank's vault, the less is available for lending and the less money the bank stands to make.

Exercise:

Problem:

Bank runs are often described as "self-fulfilling prophecies." Why is this phrase appropriate to bank runs?

Solution:

The fear and uncertainty created by the suggestion that a bank might fail can lead depositors to withdraw their money. If many depositors do this at the same time, the bank may not be able to meet their demands and will, indeed, fail.

Review Questions

Exercise:

Problem:

How is bank regulation linked to the conduct of monetary policy?

Exercise:

Problem: What is a bank run?

Exercise:

Problem:

In a program of deposit insurance as it is operated in the United States, what is being insured and who pays the insurance premiums?

Exercise:

Problem:

In government programs of bank supervision, what is being supervised?

Exercise:

Problem: What is the lender of last resort?

Exercise:

Problem:

Name and briefly describe the responsibilities of each of the following agencies: FDIC, NCUA, and OCC.

Critical Thinking Question

Exercise:

Problem:

The term “moral hazard” describes increases in risky behavior resulting from efforts to make that behavior safer. How does the concept of moral hazard apply to deposit insurance and other bank regulations?

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Glossary

bank run
: when depositors race to the bank to withdraw their deposits for fear that otherwise they would be lost

deposit insurance
: an insurance system that makes sure depositors in a bank do not lose their money, even if the bank goes bankrupt

lender of last resort
: an institution that provides short-term emergency loans in conditions of financial crisis

Introduction to Government Budgets and Fiscal Policy
class="introduction"
Shut Downs and Parks

Yellowstone National Park is one of the many national parks forced to close down during the government shut down in October 2013. (Credit: modification of work by “daveynin”/flickr Creative Commons)



Note:

No Yellowstone Park?

So you had trekked all the way to see Yellowstone National Park in the beautiful month of October 2013, only to find it… closed. Closed! Why? For two weeks in October 2013, the U.S. federal government shut down. Many federal services, like the national parks, closed and 800,000 federal employees were furloughed. Tourists were shocked and so was the rest of the world: Congress and the President could not agree on a budget. Inside the Capitol, Republicans and Democrats argued about spending priorities and whether to increase the national debt limit. Each year's budget, which is over $3 trillion of spending, must be approved by Congress and signed by the President. Two thirds of the budget is entitlements and other mandatory spending which occur without congressional or presidential action once the programs are set up. Tied to the budget debate was the issue of increasing the debt ceiling—how high the national debt of the U.S. government can be. The House of Representatives refused to sign on to the bills to fund the government unless they included provisions to stop or change the Affordable Health Care Act (more colloquially known as Obamacare). As the days ticked by, the United States came very close to defaulting on its debt.

Why does the federal budget create such intense debates? What would happen if the United States actually defaulted on its debt? In this chapter, we will examine the federal budget, taxation, and fiscal policy. We will also look at the annual federal budget deficits and the national debt.

Note:

Introduction to Government Budgets and Fiscal Policy

In this chapter, you will learn about:

- Government Spending
- Taxation
- Federal Deficits and the National Debt
- Using Fiscal Policy to Fight Recessions, Unemployment, and Inflation
- Automatic Stabilizers

- Practical Problems with Discretionary Fiscal Policy
- The Question of a Balanced Budget

All levels of government—federal, state, and local—have budgets that show how much revenue the government expects to receive in taxes and other income and how the government plans to spend it. Budgets, however, can shift dramatically within a few years, as policy decisions and unexpected events shake up earlier tax and spending plans.

In this chapter, we revisit fiscal policy, which was first covered in Welcome to Economics! Fiscal policy is one of two policy tools for fine tuning the economy (the other is monetary policy). While monetary policy is made by policymakers at the Federal Reserve, fiscal policy is made by Congress and the President.

The discussion of fiscal policy focuses on how federal government taxing and spending affects aggregate demand. All government spending and taxes affect the economy, but fiscal policy focuses strictly on the policies of the federal government. We begin with an overview of U.S. government spending and taxes. We then discuss fiscal policy from a short-run perspective; that is, how government uses tax and spending policies to address recession, unemployment, and inflation; how periods of recession and growth affect government budgets; and the merits of balanced budget proposals.

Government Spending

By the end of this section, you will be able to:

- Identify U.S. budget deficit and surplus trends over the past five decades
- Explain the differences between the U.S. federal budget, and state and local budgets

Government spending covers a range of services provided by the federal, state, and local governments. When the federal government spends more money than it receives in taxes in a given year, it runs a **budget deficit**. Conversely, when the government receives more money in taxes than it spends in a year, it runs a **budget surplus**. If government spending and taxes are equal, it is said to have a **balanced budget**. For example, in 2009, the U.S. government experienced its largest budget deficit ever, as the federal government spent $1.4 trillion more than it collected in taxes. This deficit was about 10% of the size of the U.S. GDP in 2009, making it by far the largest budget deficit relative to GDP since the mammoth borrowing used to finance World War II.

This section presents an overview of government spending in the United States.

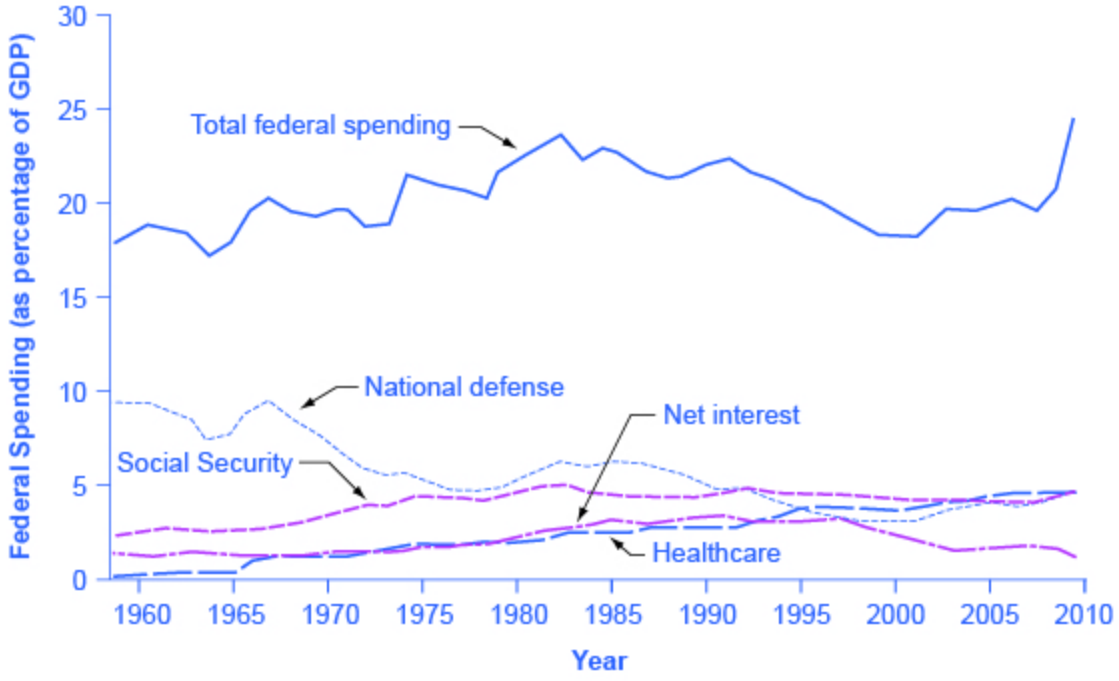
Total U.S. Government Spending

Federal spending in nominal dollars (that is, dollars not adjusted for inflation) has grown by a multiple of more than 38 over the last four decades, from $93.4 billion in 1960 to $3.9 trillion in 2014. Comparing spending over time in nominal dollars is misleading because it does not take into account inflation or growth in population and the real economy. A more useful method of comparison is to examine government spending as a percent of GDP over time.

The top line in [link] shows the level of federal spending since 1960, expressed as a share of GDP. Despite a widespread sense among many Americans that the federal government has been growing steadily larger, the

graph shows that federal spending has hovered in a range from 18% to 22% of GDP most of the time since 1960. The other lines in [link] show the major federal spending categories: national defense, Social Security, health programs, and interest payments. From the graph, we see that national defense spending as a share of GDP has generally declined since the 1960s, although there were some upward bumps in the 1980s buildup under President Ronald Reagan and in the aftermath of the terrorist attacks on September 11, 2001. In contrast, Social Security and healthcare have grown steadily as a percent of GDP. Healthcare expenditures include both payments for senior citizens (Medicare), and payments for low-income Americans (Medicaid). Medicaid is also partially funded by state governments. Interest payments are the final main category of government spending shown in the figure.

Federal Spending, 1960–2014



Since 1960, total federal spending has ranged from about 18% to 22% of GDP, although it climbed above that level in 2009, but quickly dropped back down to that level by 2013. The share spent on national defense has generally declined, while the share spent on Social Security and on healthcare expenses (mainly Medicare and Medicaid) has increased. (Source: *Economic Report of the*

President, Tables B-2 and B-22, http://www.gpo.gov/fdsys/pkg/ERP-2014/content-detail.html)

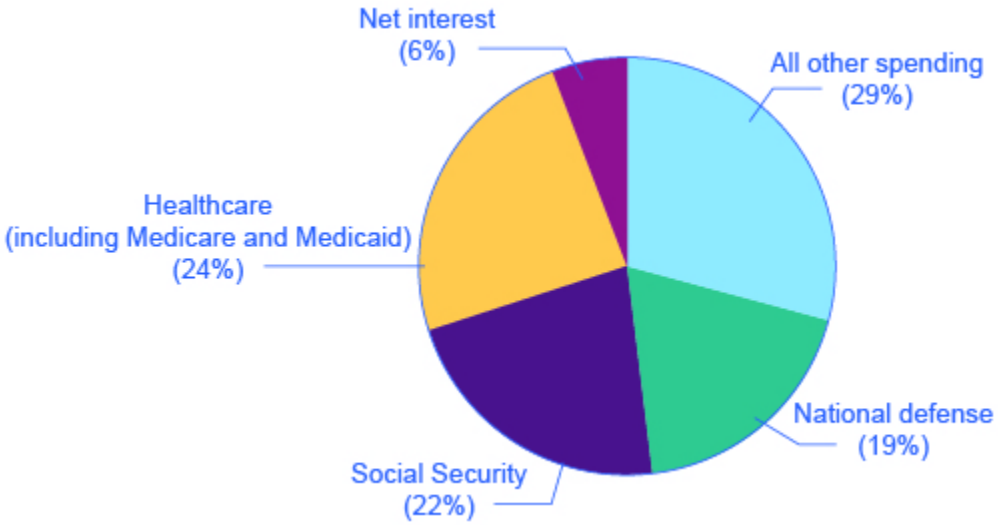
Each year, the government borrows funds from U.S. citizens and foreigners to cover its budget deficits. It does this by selling securities (Treasury bonds, notes, and bills)—in essence borrowing from the public and promising to repay with interest in the future. From 1961 to 1997, the U.S. government has run budget deficits, and thus borrowed funds, in almost every year. It had budget surpluses from 1998 to 2001, and then returned to deficits.

The interest payments on past federal government borrowing were typically 1–2% of GDP in the 1960s and 1970s but then climbed above 3% of GDP in the 1980s and stayed there until the late 1990s. The government was able to repay some of its past borrowing by running surpluses from 1998 to 2001 and, with help from low interest rates, the interest payments on past federal government borrowing had fallen back to 1.4% of GDP by 2012.

We investigate the patterns of government borrowing and debt in more detail later in this chapter, but first we need to clarify the difference between the deficit and the debt. *The deficit is not the debt*. The difference between the deficit and the debt lies in the time frame. The government deficit (or surplus) refers to what happens with the federal government budget each year. The government debt is accumulated over time; it is the sum of all past deficits and surpluses. If you borrow $10,000 per year for each of the four years of college, you might say that your annual deficit was $10,000, but your accumulated debt over the four years is $40,000.

These four categories—national defense, Social Security, healthcare, and interest payments—account for roughly 73% of all federal spending, as [link] shows. The remaining 27% wedge of the pie chart covers all other categories of federal government spending: international affairs; science and technology; natural resources and the environment; transportation; housing; education; income support for the poor; community and regional development; law enforcement and the judicial system; and the administrative costs of running the government.

Slices of Federal Spending, 2014

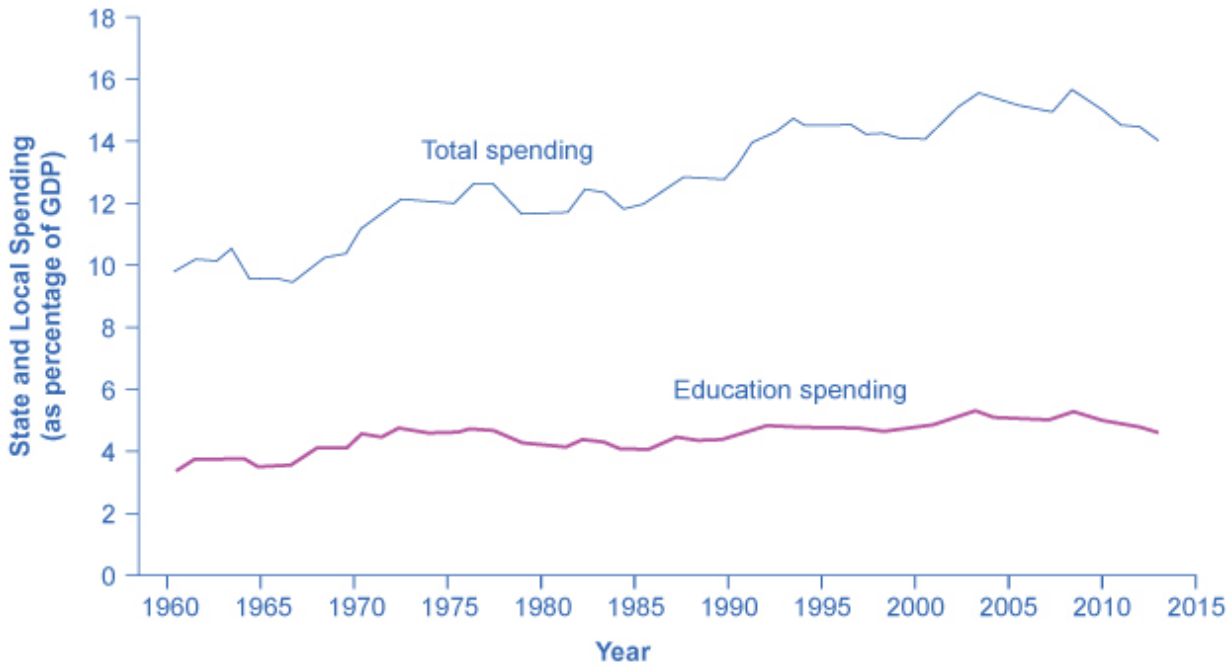


About 73% of government spending goes to four major areas: national defense, Social Security, healthcare, and interest payments on past borrowing. This leaves about 29% of federal spending for all other functions of the U.S. government. (Source: https://www.whitehouse.gov/omb/budget/Historicals/)

State and Local Government Spending

Although federal government spending often gets most of the media attention, state and local government spending is also substantial—at about $3.1 trillion in 2014. [link] shows that state and local government spending has increased during the last four decades from around 8% to around 14% today. The single biggest item is education, which accounts for about one-third of the total. The rest covers programs like highways, libraries, hospitals and healthcare, parks, and police and fire protection. Unlike the federal government, all states (except Vermont) have balanced budget laws, which means any gaps between revenues and spending must be closed by higher taxes, lower spending, drawing down their previous savings, or some combination of all of these.

State and Local Spending, 1960–2013



Spending by state and local government increased from about 10% of GDP in the early 1960s to 14–16% by the mid-1970s. It has remained at roughly that level since. The single biggest spending item is education, including both K–12 spending and support for public colleges and universities, which has been about 4–5% of GDP in recent decades. Source: (Source: Bureau of Economic Analysis.)

U.S. presidential candidates often run for office pledging to improve the public schools or to get tough on crime. However, in the U.S. system of government, these tasks are primarily the responsibilities of state and local governments. Indeed, in fiscal year 2014 state and local governments spent about $840 billion per year on education (including K–12 and college and university education), compared to only $100 billion by the federal government, according to usgovernmentspending.com. In other words, about 90 cents of every dollar spent on education happens at the state and local level. A politician who really wants hands-on responsibility for reforming education or reducing crime might do better to run for mayor of a large city or for state governor rather than for president of the United States.

Key Concepts and Summary

Fiscal policy is the set of policies that relate to federal government spending, taxation, and borrowing. In recent decades, the level of federal government spending and taxes, expressed as a share of GDP, has not changed much, typically fluctuating between about 18% to 22% of GDP. However, the level of state spending and taxes, as a share of GDP, has risen from about 12–13% to about 20% of GDP over the last four decades. The four main areas of federal spending are national defense, Social Security, healthcare, and interest payments, which together account for about 70% of all federal spending. When a government spends more than it collects in taxes, it is said to have a budget deficit. When a government collects more in taxes than it spends, it is said to have a budget surplus. If government spending and taxes are equal, it is said to have a balanced budget. The sum of all past deficits and surpluses make up the government debt.

Self-Check Questions

Exercise:

Problem:

When governments run budget deficits, how do they make up the differences between tax revenue and spending?

Solution:

The government borrows funds by selling Treasury bonds, notes, and bills.

Exercise:

Problem:

When governments run budget surpluses, what is done with the extra funds?

Solution:

The funds can be used to pay down the national debt or else be refunded to the taxpayers.

Exercise:

Problem:

Is it possible for a nation to run budget deficits and still have its debt/GDP ratio fall? Explain your answer. Is it possible for a nation to run budget surpluses and still have its debt/GDP ratio rise? Explain your answer.

Solution:

Yes, a nation can run budget deficits and see its debt/GDP ratio fall. In fact, this is not uncommon. If the deficit is small in a given year, than the addition to debt in the numerator of the debt/GDP ratio will be relatively small, while the growth in GDP is larger, and so the debt/GDP ratio declines. This was the experience of the U.S. economy for the period from the end of World War II to about 1980. It is also theoretically possible, although not likely, for a nation to have a budget surplus and see its debt/GDP ratio rise. Imagine the case of a nation with a small surplus, but in a recession year when the economy shrinks. It is possible that the decline in the nation's debt, in the numerator of the debt/GDP ratio, would be proportionally less than the fall in the size of GDP, so the debt/GDP ratio would rise.

Review Questions

Exercise:

Problem:

Give some examples of changes in federal spending and taxes by the government that would be fiscal policy and some that would not.

Exercise:

Problem:

Have the spending and taxes of the U.S. federal government generally had an upward or a downward trend in the last few decades?

Exercise:

Problem:

What are the main categories of U.S. federal government spending?

Exercise:

Problem:

What is the difference between a budget deficit, a balanced budget, and a budget surplus?

Exercise:

Problem:

Have spending and taxes by state and local governments in the United States had a generally upward or downward trend in the last few decades?

Critical Thinking Questions

Exercise:

Problem:

Why is government spending typically measured as a percentage of GDP rather than in nominal dollars?

Exercise:

Problem:

Why are expenditures such as crime prevention and education typically done at the state and local level rather than at the federal level?

Exercise:

Problem:

Why is spending by the U.S. government on scientific research at NASA fiscal policy while spending by the University of Illinois is not fiscal policy? Why is a cut in the payroll tax fiscal policy whereas a cut in a state income tax is not fiscal policy?

Problems

Exercise:

Problem:

A government starts off with a total debt of $3.5 billion. In year one, the government runs a deficit of $400 million. In year two, the government runs a deficit of $1 billion. In year three, the government runs a surplus of $200 million. What is the total debt of the government at the end of year three?

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Glossary

balanced budget
: when government spending and taxes are equal

budget deficit
: when the federal government spends more money than it receives in taxes in a given year

budget surplus
: when the government receives more money in taxes than it spends in a year

Taxation

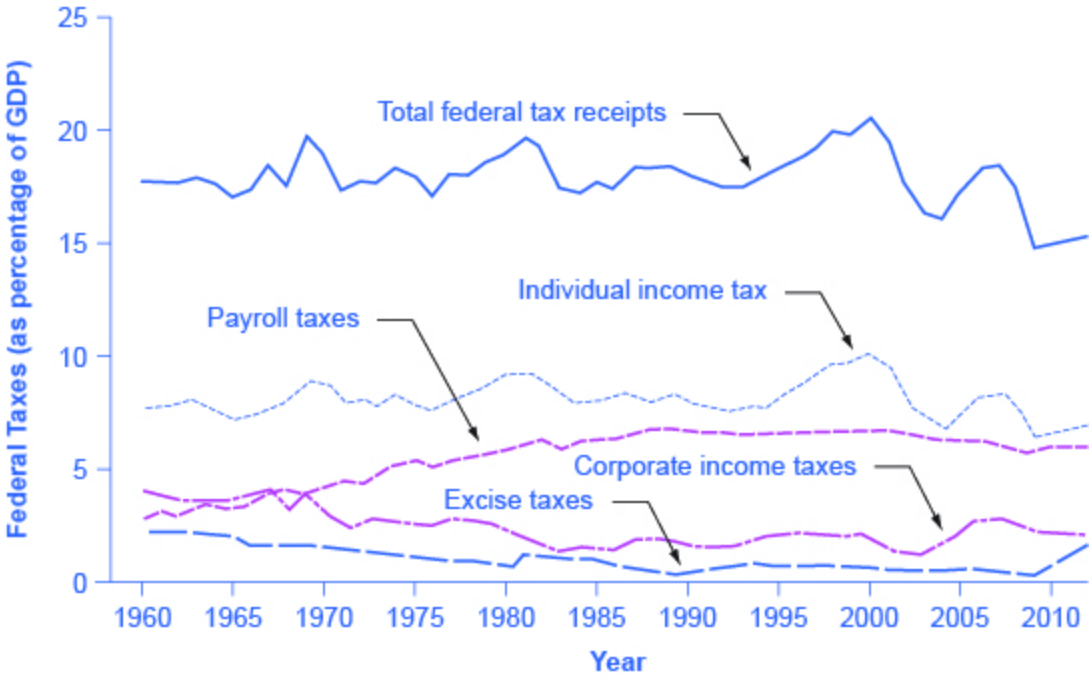
By the end of this section, you will be able to:

- Differentiate among a regressive tax, a proportional tax, and a progressive tax
- Identify the major sources of revenue for the U.S. federal budget

There are two main categories of taxes: those collected by the federal government and those collected by state and local governments. What percentage is collected and what that revenue is used for varies greatly. The following sections will briefly explain the taxation system in the United States.

Federal Taxes

Just as many Americans erroneously think that federal spending has grown considerably, many also believe that taxes have increased substantially. The top line of [link] shows total federal taxes as a share of GDP since 1960. Although the line rises and falls, it typically remains within the range of 17% to 20% of GDP, except for 2009, when taxes fell substantially below this level, due to recession.
Federal Taxes, 1960–2014



Federal tax revenues have been about 17–20% of GDP during most periods in recent decades. The primary sources of federal taxes are individual income taxes and the payroll taxes that finance Social Security and Medicare. Corporate income taxes and social insurance taxes provide smaller shares of revenue. (Source: *Economic Report of the President, 2015.* Table B-21, https://www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President/2015)

[link] also shows the patterns of taxation for the main categories of taxes levied by the federal government: individual income taxes, corporate income taxes, and social insurance and retirement receipts. When most people think of taxes levied by the federal government, the first tax that comes to mind is the **individual income tax** that is due every year on April 15 (or the first business day after). The personal income tax is the largest single source of federal government revenue, but it still represents less than half of federal tax revenue.

The second largest source of federal revenue is the **payroll tax** (captured in social insurance and retirement receipts), which provides funds for Social Security and Medicare. Payroll taxes have increased steadily over time. Together, the personal income tax and the payroll tax accounted for about 80% of federal tax revenues in 2014. Although personal income tax revenues account for more total revenue than the payroll tax, nearly three-quarters of households pay more in payroll taxes than in income taxes.

The income tax is a **progressive tax**, which means that the tax rates increase as a household's income increases. Taxes also vary with marital status, family size, and other factors. The **marginal tax rates** (the tax that must be paid on all yearly income) for a single taxpayer range from 10% to 35%, depending on income, as the following Clear It Up feature explains.

Note:
How does the marginal rate work?
Suppose that a single taxpayer's income is $35,000 per year. Also suppose that income from $0 to $9,075 is taxed at 10%, income from $9,075 to $36,900 is taxed at 15%, and, finally, income from $36,900 and beyond is taxed at 25%. Since this person earns $35,000, their marginal tax rate is 15%.

The key fact here is that the federal income tax is designed so that tax rates increase as income increases, up to a certain level. The payroll taxes that support Social Security and Medicare are designed in a different way. First, the payroll taxes for Social Security are imposed at a rate of 12.4% up to a certain wage limit, set at $118,500 in 2015. Medicare, on the other hand, pays for elderly healthcare, and is fixed at 2.9%, with no upper ceiling.

In both cases, the employer and the employee split the payroll taxes. An employee only sees 6.2% deducted from his paycheck for Social Security, and 1.45% from Medicare. However, as economists are quick to point out, the employer's half of the taxes are probably passed along to the employees

in the form of lower wages, so in reality, the worker pays all of the payroll taxes.

The Medicare payroll tax is also called a **proportional tax**; that is, a flat percentage of all wages earned. The Social Security payroll tax is proportional up to the wage limit, but above that level it becomes a **regressive tax**, meaning that people with higher incomes pay a smaller share of their income in tax.

The third-largest source of federal tax revenue, as shown in [link] is the **corporate income tax**. The common name for corporate income is "profits." Over time, corporate income tax receipts have declined as a share of GDP, from about 4% in the 1960s to an average of 1% to 2% of GDP in the first decade of the 2000s.

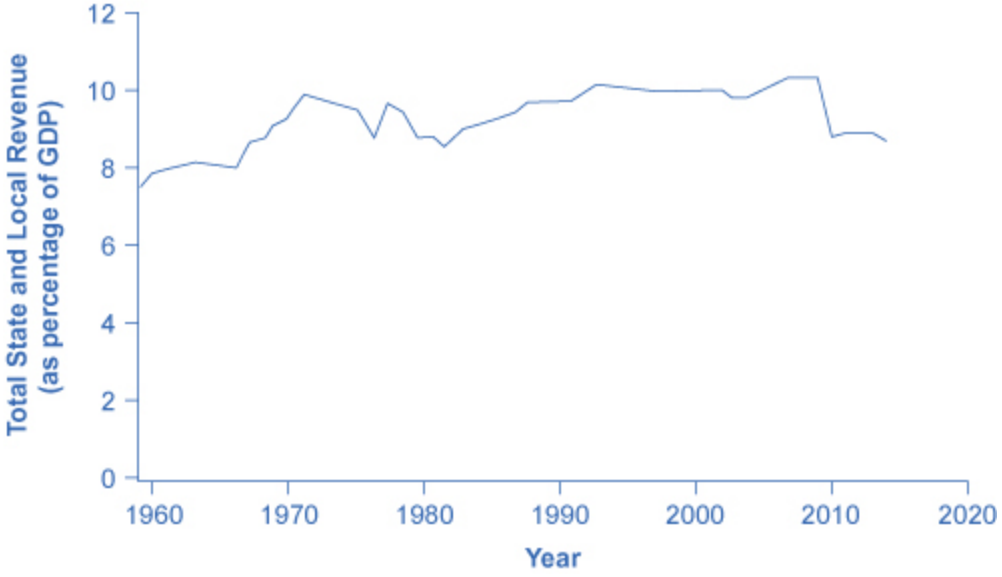
The federal government has a few other, smaller sources of revenue. It imposes an **excise tax**—that is, a tax on a particular good—on gasoline, tobacco, and alcohol. As a share of GDP, the amount collected by these taxes has stayed nearly constant over time, from about 2% of GDP in the 1960s to roughly 3% by 2014, according to the nonpartisan Congressional Budget Office. The government also imposes an **estate and gift tax** on people who pass large amounts of assets to the next generation—either after death or during life in the form of gifts. These estate and gift taxes collected about 0.2% of GDP in the first decade of the 2000s. By a quirk of legislation, the estate and gift tax was repealed in 2010, but reinstated in 2011. Other federal taxes, which are also relatively small in magnitude, include tariffs collected on imported goods and charges for inspections of goods entering the country.

State and Local Taxes

At the state and local level, taxes have been rising as a share of GDP over the last few decades to match the gradual rise in spending, as [link] illustrates. The main revenue sources for state and local governments are sales taxes, property taxes, and revenue passed along from the federal government, but many state and local governments also levy personal and corporate income taxes, as well as impose a wide variety of fees and

charges. The specific sources of tax revenue vary widely across state and local governments. Some states rely more on property taxes, some on sales taxes, some on income taxes, and some more on revenues from the federal government.

State and Local Tax Revenue as a Share of GDP, 1960–2014



State and local tax revenues have increased to match the rise in state and local spending. (Source: *Economic Report of the President, 2015.* Table B-21, https://www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President/2015)

Key Concepts and Summary

The two main federal taxes are individual income taxes and payroll taxes that provide funds for Social Security and Medicare; these taxes together account for more than 80% of federal revenues. Other federal taxes include the corporate income tax, excise taxes on alcohol, gasoline and tobacco, and the estate and gift tax. A progressive tax is one, like the federal income tax, where those with higher incomes pay a higher share of taxes out of their income than those with lower incomes. A proportional tax is one, like the payroll tax for Medicare, where everyone pays the same share of taxes

regardless of income level. A regressive tax is one, like the payroll tax (above a certain threshold) that supports Social Security, where those with high income pay a lower share of income in taxes than those with lower incomes.

Self-Check Questions

Exercise:

Problem:

Suppose that gifts were taxed at a rate of 10% for amounts up to $100,000 and 20% for anything over that amount. Would this tax be regressive or progressive?

Solution:

Progressive. People who give larger gifts subject to the higher tax rate would typically have larger incomes as well.

Exercise:

Problem:

If an individual owns a corporation for which he is the only employee, which different types of federal tax will he have to pay?

Solution:

Corporate income tax on his profits, individual income tax on his salary, and payroll tax taken out of the wages he pays himself.

Exercise:

Problem:

What taxes would an individual pay if he were self-employed and the business is not incorporated?

Solution:

individual income taxes

Exercise:

Problem:

The social security tax is 6.2% on employees' income earned below $113,000. Is this tax progressive, regressive or proportional?

Solution:

The tax is regressive because wealthy income earners are not taxed at all on income above $113,000. As a percent of total income, the social security tax hits lower income earners harder than wealthier individuals.

Review Questions

Exercise:

Problem:

What are the main categories of U.S. federal government taxes?

Exercise:

Problem:

What is the difference between a progressive tax, a proportional tax, and a regressive tax?

Critical Thinking Questions

Exercise:

Problem:

Excise taxes on tobacco and alcohol and state sales taxes are often criticized for being regressive. Although everyone pays the same rate regardless of income, why might this be so?

Exercise:

Problem:

What is the benefit of having state and local taxes on income instead of collecting all such taxes at the federal level?

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Glossary

corporate income tax
: a tax imposed on corporate profits

estate and gift tax
: a tax on people who pass assets to the next generation—either after death or during life in the form of gifts

excise tax

a tax on a specific good—on gasoline, tobacco, and alcohol

individual income tax
: a tax based on the income, of all forms, received by individuals

marginal tax rates
: or the tax that must be paid on all yearly income

payroll tax
: a tax based on the pay received from employers; the taxes provide funds for Social Security and Medicare

progressive tax
: a tax that collects a greater share of income from those with high incomes than from those with lower incomes

proportional tax
: a tax that is a flat percentage of income earned, regardless of level of income

regressive tax
: a tax in which people with higher incomes pay a smaller share of their income in tax

Federal Deficits and the National Debt

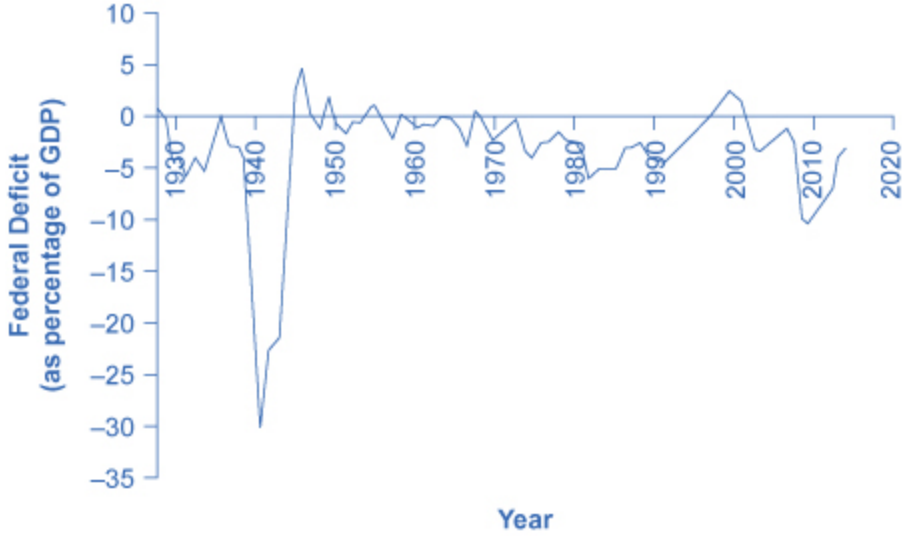
By the end of this section, you will be able to:

- Explain the U.S. federal budget in terms of annual debt and accumulated debt
- Understand how economic growth or decline can influence a budget surplus or budget deficit

Having discussed the revenue (taxes) and expense (spending) side of the budget, we now turn to the annual budget deficit or surplus, which is the difference between the tax revenue collected and spending over a fiscal year, which starts October 1 and ends September 30 of the next year.

[link] shows the pattern of annual federal budget deficits and surpluses, back to 1930, as a share of GDP. When the line is above the horizontal axis, the budget is in surplus; when the line is below the horizontal axis, a budget deficit occurred. Clearly, the biggest deficits as a share of GDP during this time were incurred to finance World War II. Deficits were also large during the 1930s, the 1980s, the early 1990s, and most recently during the recession of 2008–2009.

Pattern of Federal Budget Deficits and Surpluses, 1929–2014



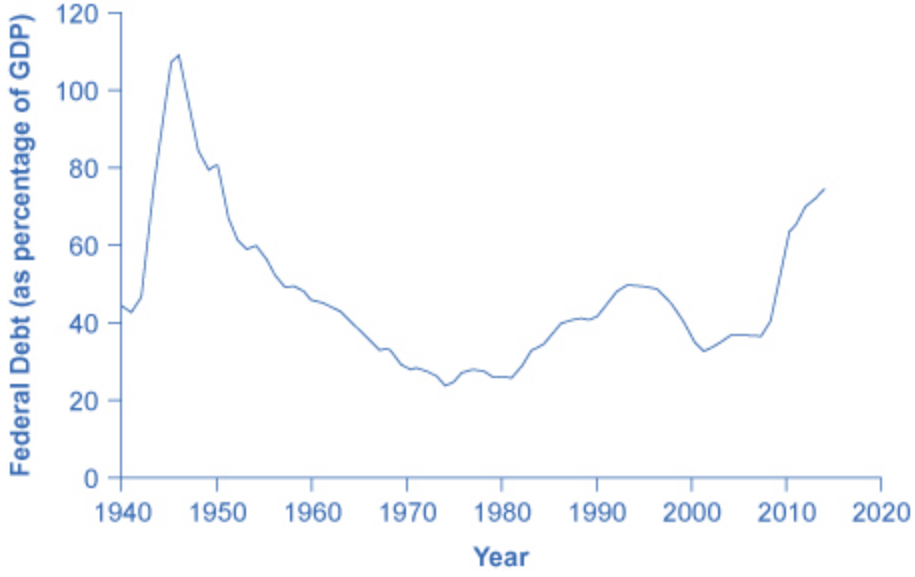
The federal government has run budget deficits for decades. The budget was briefly in surplus in the late 1990s, before heading into deficit again in the first decade

of the 2000s—and especially deep deficits in the recession of 2008–2009. (Source: Federal Reserve Bank of St. Louis (FRED). http://research.stlouisfed.org/fred2/series/FYFSGDA188S)

Debt/GDP Ratio

Another useful way to view the budget deficit is through the prism of accumulated debt rather than annual deficits. The **national debt** refers to the total amount that the government has borrowed over time; in contrast, the budget deficit refers to how much has been borrowed in one particular year. [link] shows the ratio of debt/GDP since 1940. Until the 1970s, the debt/GDP ratio revealed a fairly clear pattern of federal borrowing. The government ran up large deficits and raised the debt/GDP ratio in World War II, but from the 1950s to the 1970s the government ran either surpluses or relatively small deficits, and so the debt/GDP ratio drifted down. Large deficits in the 1980s and early 1990s caused the ratio to rise sharply. When budget surpluses arrived from 1998 to 2001, the debt/GDP ratio declined substantially. The budget deficits starting in 2002 then tugged the debt/GDP ratio higher—with a big jump when the recession took hold in 2008–2009.

Federal Debt as a Percentage of GDP, 1942–2014



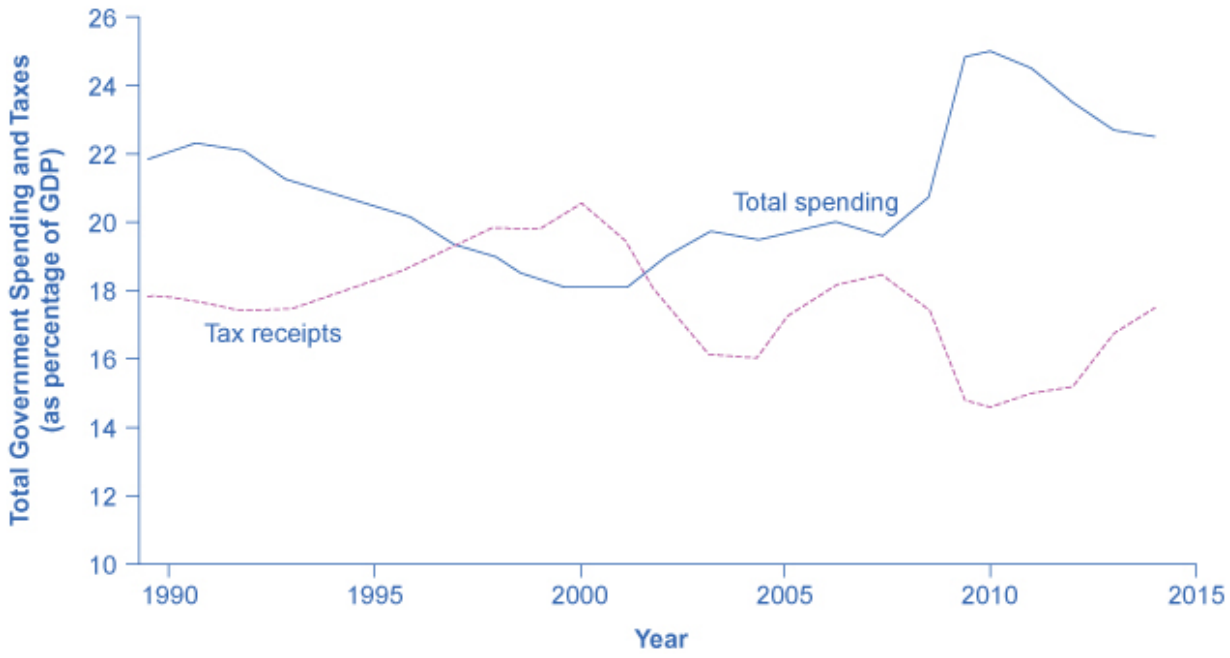
Federal debt is the sum of annual budget deficits and surpluses. Annual deficits do not always mean that the debt/GDP ratio is rising. During the 1960s and 1970s, the government often ran small deficits, but since the debt was growing more slowly than the economy, the debt/GDP ratio was declining over this time. In the 2008–2009 recession, the debt/GDP ratio rose sharply. (Source: *Economic Report of the President, Table B-20,* http://www.gpo.gov/fdsys/pkg/ERP-2015/content-detail.html)

The next Clear it Up feature discusses how the government handles the national debt.

Note:
What is the national debt?
One year's federal budget deficit causes the federal government to sell Treasury bonds to make up the difference between spending programs and tax revenues. The dollar value of all the outstanding Treasury bonds on which the federal government owes money is equal to the national debt.

The Path from Deficits to Surpluses to Deficits

Why did the budget deficits suddenly turn to surpluses from 1998 to 2001? And why did the surpluses return to deficits in 2002? Why did the deficit become so large after 2007? [link] suggests some answers. The graph combines the earlier information on total federal spending and taxes in a single graph, but focuses on the federal budget since 1990.
Total Government Spending and Taxes as a Share of GDP, 1990–2014



When government spending exceeds taxes, the gap is the budget deficit. When taxes exceed spending, the gap is a budget surplus. The recessionary period starting in late 2007 saw higher spending and lower taxes, combining to create a large deficit in 2009. (Source: *Economic Report of the President, Tables B-21 and B-1*,"http://www.gpo.gov/fdsys/pkg/ERP-2015/content-detail.html)

Government spending as a share of GDP declined steadily through the 1990s. The biggest single reason was that defense spending declined from 5.2% of GDP in 1990 to 3.0% in 2000, but interest payments by the federal government also fell by about 1.0% of GDP. However, federal tax collections increased substantially in the later 1990s, jumping from 18.1% of GDP in 1994 to 20.8% in 2000. Powerful economic growth in the late 1990s fueled the boom in taxes. Personal income taxes rise as income goes up; payroll taxes rise as jobs and payrolls go up; corporate income taxes rise as profits go up. At the same time, government spending on transfer payments such as unemployment benefits, foods stamps, and welfare declined with more people working.

This sharp increase in tax revenues and decrease in expenditures on transfer payments was largely unexpected even by experienced budget analysts, and so budget surpluses came as a surprise. But in the early 2000s, many of these factors started running in reverse. Tax revenues sagged, due largely to the recession that started in March 2001, which reduced revenues. A series of tax cuts was enacted by Congress and signed into law by President George W. Bush, starting in 2001. In addition, government spending swelled due to increases in defense, healthcare, education, Social Security, and support programs for those who were hurt by the recession and the slow growth that followed. Deficits returned. When the severe recession hit in late 2007, spending climbed and tax collections fell to historically unusual levels, resulting in enormous deficits.

Longer-term forecasts of the U.S. budget, a decade or more into the future, predict enormous deficits. The higher deficits run during the recession of 2008–2009 have repercussions, and the demographics will be challenging. The primary reason is the “baby boom”—the exceptionally high birthrates that began in 1946, right after World War II, and lasted for about two decades. Starting in 2010, the front edge of the baby boom generation began to reach age 65, and in the next two decades, the proportion of Americans over the age of 65 will increase substantially. The current level of the payroll taxes that support Social Security and Medicare will fall well short of the projected expenses of these programs, as the following Clear It Up feature shows; thus, the forecast is for large budget deficits. A decision to collect more revenue to support these programs or to decrease benefit levels would alter this long-term forecast.

Note:
What is the long-term budget outlook for Social Security and Medicare?
In 1946, just one American in 13 was over age 65. By 2000, it was one in eight. By 2030, one American in five will be over age 65. Two enormous U.S. federal programs focus on the elderly—Social Security and Medicare. The growing numbers of elderly Americans will increase spending on these programs, as well as on Medicaid. The current payroll tax levied on workers, which supports all of Social Security and the hospitalization

insurance part of Medicare, will not be enough to cover the expected costs. So, what are the options?

Long-term projections from the Congressional Budget Office in 2009 are that Medicare and Social Security spending combined will rise from 8.3% of GDP in 2009 to about 13% by 2035 and about 20% in 2080. If this rise in spending occurs, without any corresponding rise in tax collections, then some mix of changes must occur: (1) taxes will need to be increased dramatically; (2) other spending will need to be cut dramatically; (3) the retirement age and/or age receiving Medicare benefits will need to increase, or (4) the federal government will need to run extremely large budget deficits.

Some proposals suggest removing the cap on wages subject to the payroll tax, so that those with very high incomes would have to pay the tax on the entire amount of their wages. Other proposals suggest moving Social Security and Medicare from systems in which workers pay for retirees toward programs that set up accounts where workers save funds over their lifetimes and then draw out after retirement to pay for healthcare.

The United States is not alone in this problem. Indeed, providing the promised level of retirement and health benefits to a growing proportion of elderly with a falling proportion of workers is an even more severe problem in many European nations and in Japan. How to pay promised levels of benefits to the elderly will be a difficult public policy decision.

In the next module we shift to the use of fiscal policy to counteract business cycle fluctuations. In addition, we will explore proposals requiring a balanced budget—that is, for government spending and taxes to be equal each year. The Impacts of Government Borrowing will also cover how fiscal policy and government borrowing will affect national saving—and thus affect economic growth and trade imbalances.

Key Concepts and Summary

For most of the twentieth century, the U.S. government took on debt during wartime and then paid down that debt slowly in peacetime. However, it took on quite substantial debts in peacetime in the 1980s and early 1990s,

before a brief period of budget surpluses from 1998 to 2001, followed by a return to annual budget deficits since 2002, with very large deficits in the recession of 2008 and 2009. A budget deficit or budget surplus is measured annually. Total government debt or national debt is the sum of budget deficits and budget surpluses over time.

Self-Check Questions

Exercise:

Problem:

Debt has a certain self-reinforcing quality to it. There is one category of government spending that automatically increases along with the federal debt. What is it?

Solution:

As debt increases, interest payments also rise, so that the deficit grows even if we keep other government spending constant.

Exercise:

Problem: True or False:

a. Federal spending has grown substantially in recent decades.
b. By world standards, the U.S. government controls a relatively large share of the U.S. economy.
c. A majority of the federal government's revenue is collected through personal income taxes.
d. Education spending is slightly larger at the federal level than at the state and local level.
e. State and local government spending has not risen much in recent decades.
f. Defense spending is higher now than ever.
g. The share of the economy going to federal taxes has increased substantially over time.

h. Foreign aid is a large portion, although less than half, of federal spending.
i. Federal deficits have been very large for the last two decades.
j. The accumulated federal debt as a share of GDP is near an all-time high.

Solution:

a. As a share of GDP, this is false. In nominal dollars, it is true.
b. False.
c. False.
d. False. Education spending is much higher at the state level.
e. False. As a share of GDP, it is up about 50.
f. As a share of GDP, this is false, and in real dollars, it is also false.
g. False.
h. False; it's about 1%.
i. False. Although budget deficits were large in 2003 and 2004, and continued into the later 2000s, the federal government ran budget surpluses from 1998–2001.
j. False.

Review Questions

Exercise:

Problem:

What has been the general pattern of U.S. budget deficits in recent decades?

Exercise:

Problem:

What is the difference between a budget deficit and the national debt?

Critical Thinking Questions

Exercise:

Problem:

In a booming economy, is the federal government more likely to run surpluses or deficits? What are the various factors at play?

Exercise:

Problem:

Economist Arthur Laffer famously pointed out that, in some cases, income tax revenue can actually go up when tax rates go down. Why might this be the case?

Exercise:

Problem:

Is it possible for a nation to run budget deficits and still have its debt/GDP ratio fall? Explain your answer. Is it possible for a nation to run budget surpluses and still have its debt/GDP ratio rise? Explain your answer.

Problems

Exercise:

Problem:

If a government runs a budget deficit of $10 billion dollars each year for ten years, then a surplus of $1 billion for five years, and then a balanced budget for another ten years, what is the government debt?

References

Eisner, Robert. *The Great Deficit Scares: The Federal Budget, Trade, and Social Security*. New York: Priority Press Publications, 1997.

Weisman, Jonathan, and Ashley Parker. “Republicans Back Down, Ending Crisis Over Shutdown and Debt Limit.” *The New York Times*, October 16, 2013. http://www.nytimes.com/2013/10/17/us/congress-budget-debate.html.

Wessel, David. *Red Ink: Inside the High-Stakes Politics of Federal Budget*. New York: Crown Publishing Group, 2013.

Glossary

national debt
: the total accumulated amount the government has borrowed, over time, and not yet paid back